LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

ATCHAFALAYA BASIN

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Black bass, crappie, and catfish are managed to provide anglers the greatest opportunity to catch and harvest a limit of fish. Sunfish are managed to provide a sustainable population while providing anglers the opportunity to catch and harvest numbers of fish.

Commercial

Commercial species are managed with statewide regulations to provide a maximum sustainable yield that does not contribute to declines in future population strength.

Species of Special Concern

The harvest of pallid sturgeon, *Scaphirhynchus albus*, and shovelnose sturgeon, *Scaphirhynchus platorynchus* is prohibited.

The recreational harvest of paddlefish, *Polyodon spathula,* provides that two fish, not exceeding 30 inches lower jaw–fork length, may be harvested daily. Paddlefish greater than 30 inches must be returned immediately to the water. Taking or possessing paddlefish in all saltwater areas of the state is prohibited. The possession and transportation of live paddlefish is prohibited. All harvested paddlefish shall be maintained intact while on the water. No person shall have paddlefish eggs that are not fully attached to the fish in their possession while on the water. The commercial harvest of paddlefish is prohibited.

EXISTING HARVEST REGULATIONS

Recreational

The Louisiana Wildlife and Fisheries Commission amended a rule to repeal the 14 inch minimum length limit (MLL) on black bass in the Atchafalaya Basin and adjacent waters. Effective June 20, 2013, harvest regulations for bass included a 7 fish daily creel limit with no length restrictions. This regulation was in effect for two years, and upon its expiration, the daily creel reverted to 10 fish per day (statewide regulations) with no harvest restrictions.

The recreational regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

Commercial

The commercial fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

SPECIES EVALUATION

There have been five hurricane-related fish kills in the Basin since population monitoring was established in 1990 (Andrew-1992, Lili-2002, Rita-2005, Gustav-2008, and Isaac-2012).

Prior to 1990, limited information on the bass population in the Atchafalaya River Basin (ARB) was collected. However, it is certain that fish kills from hurricane-related events have occurred in the ARB throughout the geological history of the Atchafalaya River.

Recreational

Electrofishing is the most commonly used sampling technique to assess largemouth bass (LMB) relative abundance (catch per unit effort = CPUE), size distribution, and relative weight (physical body condition). Data collected during fall electrofishing is used to describe population trends, age composition, growth rate, and mortality rate. Water level conditions in the ARB are directly influenced by the Mississippi River. In the springtime, high, turbid waters negatively affect sampling efficiency. For that reason, electrofishing sampling is conducted in the fall only.

Electrofishing sample sites in the ARB have changed over the years. There were six original sites. Some sites became inaccessible due to accretion of sediment. These sites were replaced with alternate locations. Following Hurricane Andrew, the total number of sample sites was nine. In 2011, following the closure of the Ferriday, LA field office, LDWF's Office of Fisheries realigned their Inland Fisheries Districts, as well as Marine Fisheries Coastal Study Areas (CSA). District 9 was realigned to become the single office managing the Atchafalaya River and Basin, beginning at the Old River Control Structure and extending to the Atchafalaya Delta. After this realignment, nine more sites were added, bringing the total number of sites currently sampled to eighteen. Maps of the realigned districts, as well as a map of electrofishing sites in the Atchafalaya Basin are located in Appendix I.

Largemouth Bass

Relative abundance, size structure indices, and length distribution

Electrofishing catch per unit effort (CPUE) results depicted in Figure 1 show LMB catch rates to be highly variable. The total catch rates for 2003-2005 were fairly stable, with over 80 bass per hour. The numbers dropped over the next four years, but then had a sharp increase in 2010 and 2011. In relation to total CPUE, catch rates of individual size classes provide a more detailed description of the annual variations.

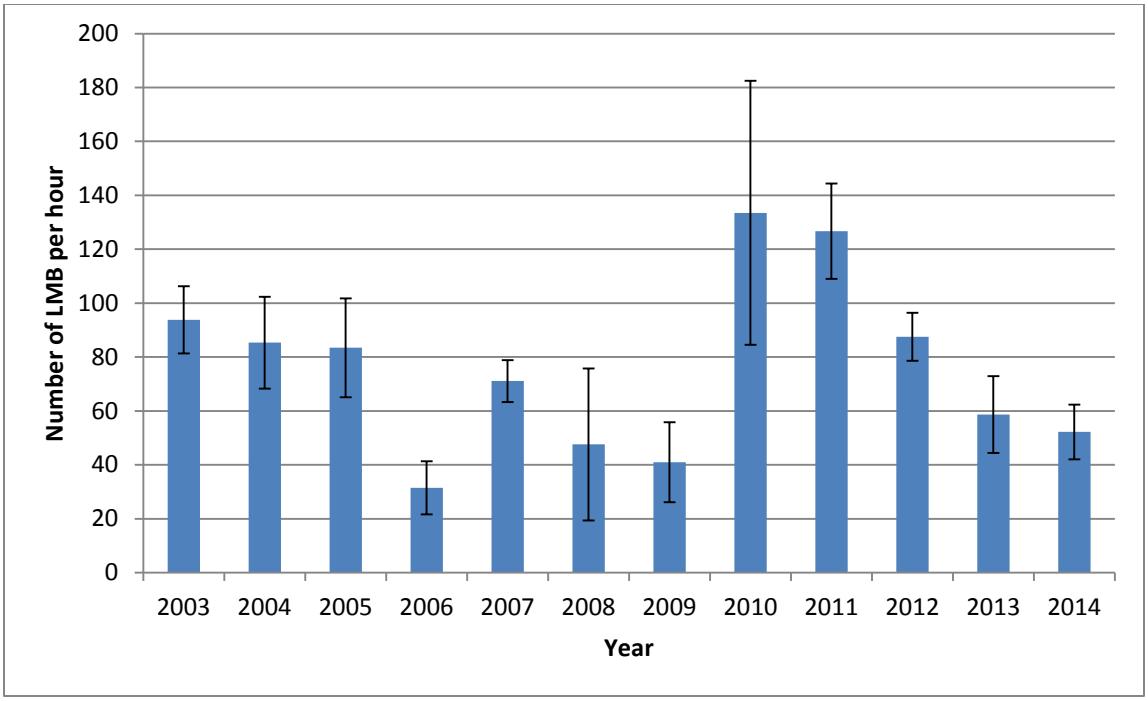

Figure 1. The mean total CPUE (± SE) for largemouth bass from the Atchafalaya River Basin, LA from fall electrofishing results (2003-2014).

Prior work indicates that water levels of sufficient height and duration during the spawning period lead to increased recruitment of nest building sport fish species (Aggus and Elliot 1975; Martin et al. 1981; Miranda et al; 1984; Noble 1986; Reinert et al. 1997; Sammons et al. 1999).

Catch indices displayed in Figure 2 show a good sub-stock and stock-size class in 2003 subsequent to Hurricane Lili related fish kills. Lower catch rates for '06 and '09 are likely related to the series of fish kills resulting from Hurricanes Rita (2005), Gustav, and Ike (2008). The increased abundance observed in the 2010 and 2011 samples reflects natural recovery from storm related fish kills.

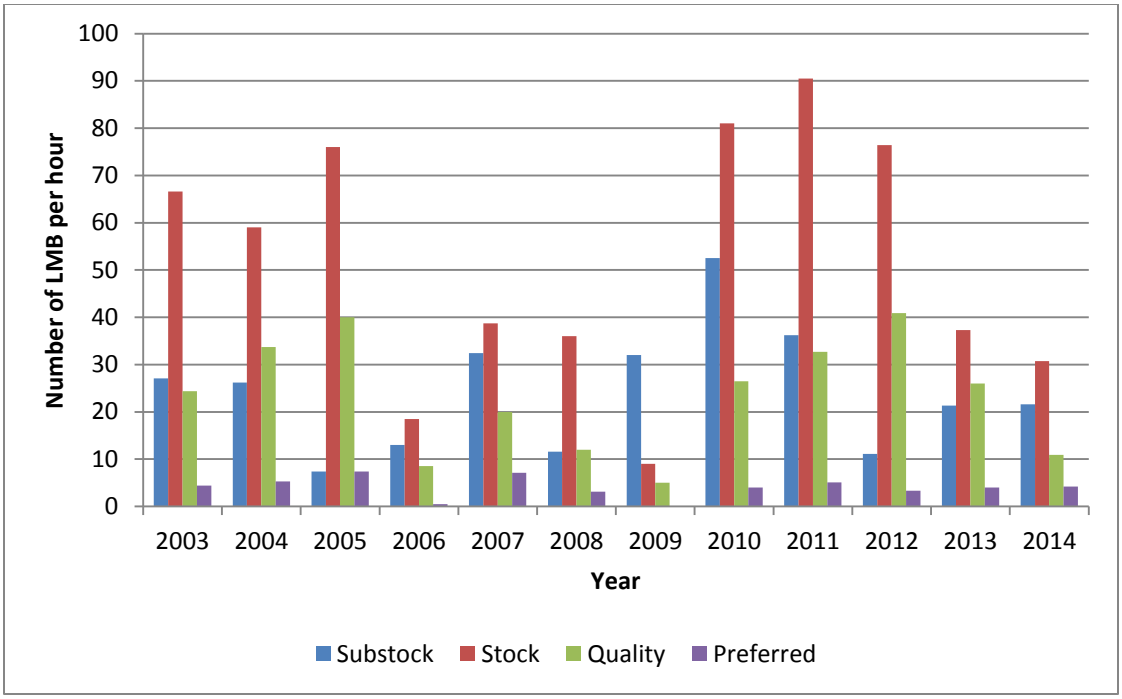

Figure 2. The CPUE for sub-stock, stock-, quality-, and preferred-size largemouth bass from the Atchafalaya Basin, LA from fall electrofishing results for 2003-2014.

Figure 2 also indicates that bass between 8 and 14 inches (stock- and quality-size) are a consistently strong component of the ARB bass population. The number of bass measuring over 14 inches shows sharp declines and then steady increases as a product of hurricane related fish kills and subsequent recovery. According to LDWF standardized electrofishing results, abundance of bass 14 inches and larger does not routinely follow years with high abundance of bass under 14 inches, even in periods of minimal weather or water related influence.

The size distribution of LMB collected during 2014 sampling efforts is depicted in Figure 3. Young-of-the-year (YOY) bass (2 to 6 inches) represent 34% of the sample. Stock and quality-size bass (8 to 14 inches) represent 51% of the sample, while bass greater than 14 inches TL represent only 8% of the sample.

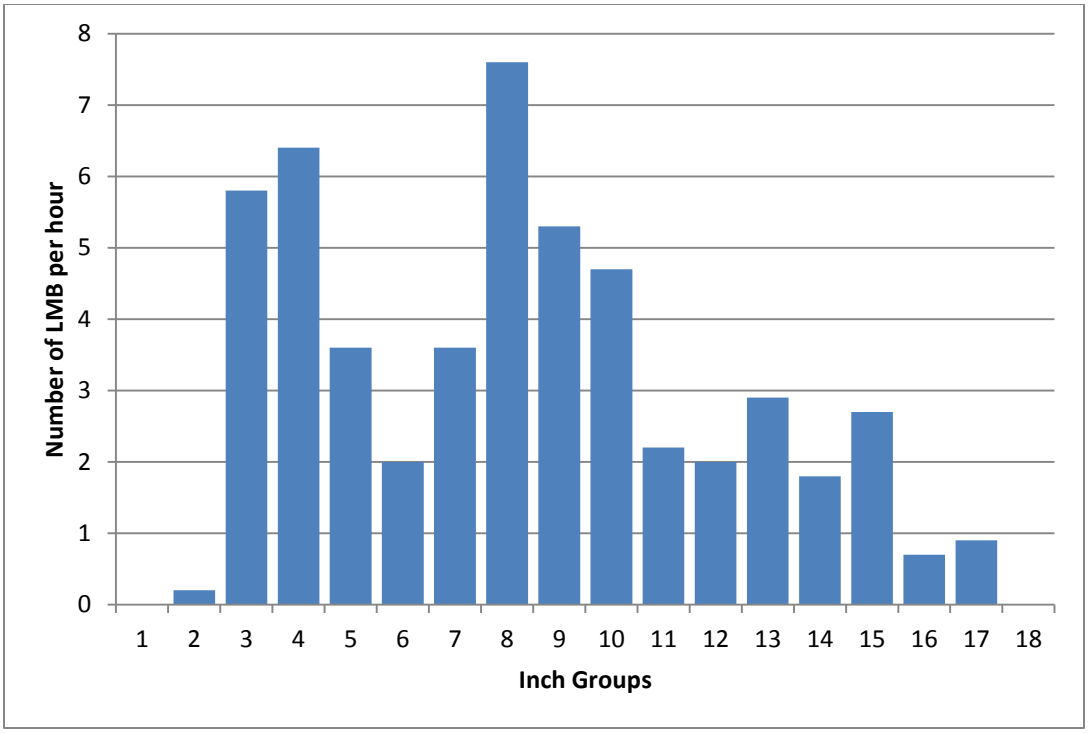

Figure 3. The size distribution (inch groups) of largemouth bass per hour of electrofishing effort for Atchafalaya Basin, LA from fall 2014 results (n=235).

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe length-frequency data (Anderson and Neumann 1996). Proportional stock density compares the number of fish of quality size (> 12 inches for largemouth bass) to the number of bass of stock size (> 8 inches in length), and is calculated by the formula:

$$PSD = \frac{\text{Number of bass} \geq 12 \text{ inches}}{\text{Number of bass} \geq 8 \text{ inches}} \times 100$$

PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. A value between 40 and 70 generally indicates a balanced bass population.

Relative stock density (preferred, RSD_{15}) is the percentage of largemouth bass in a stock (fish over 8 inches) that are also 15 inches TL or longer, and is calculated by the formula:

$$RSD_{15} = \frac{\text{Number of bass} \geq 15 \text{ inches}}{\text{Number of bass} \geq 8 \text{ inches}} \times 100$$

An RSD_{15} value between 10 and 40 indicates a balanced bass population, while values between 30 and 60 indicate a higher abundance of larger fish.

As seen in Figure 4, 12 years of continuous data show seven years having favorable PSD values (40 – 70) indicating a balanced population, but only three (2007, 2013, and 2014) of 12 years have favorable RSD_{15} values. This general absence of fish over 15 inches TL corresponds to recent size distribution data (Figure 3). The effect of environmental

influences is undoubtedly a significant contributing factor to the lack of larger bass in the population. Events occurring within this time frame include 3 major hurricanes, 2 floods, and a year of very low water levels.

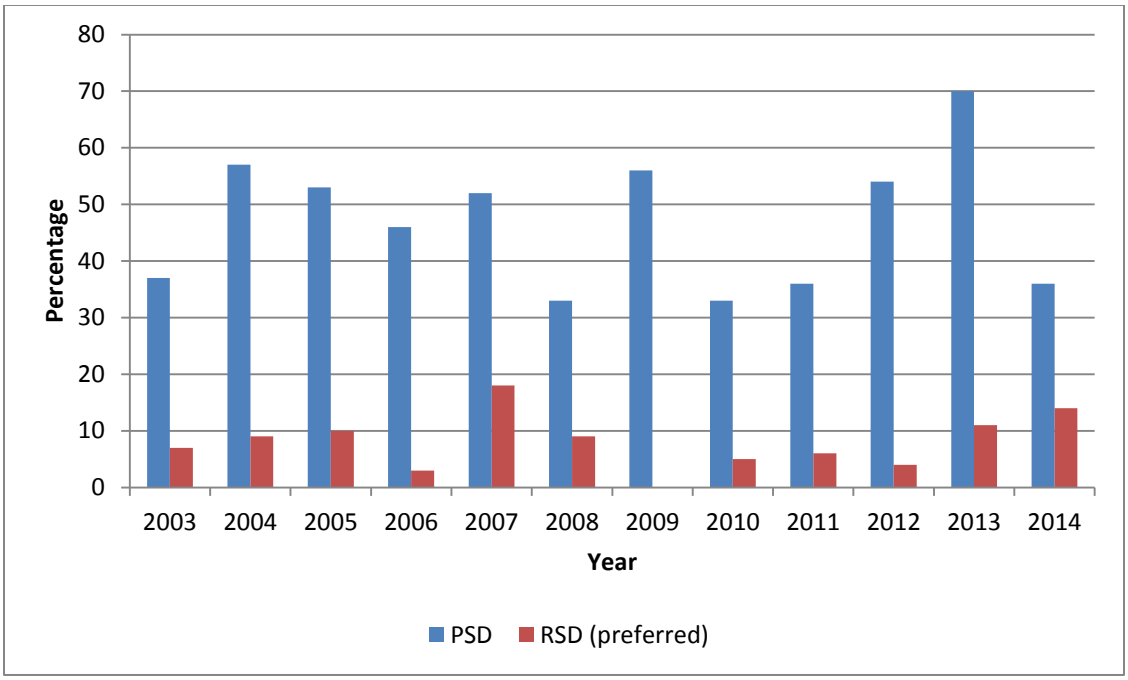

Figure 4. Proportional stock density (PSD) and relative stock density (RSD_{15}) for largemouth bass in the Atchafalaya River Basin, LA from fall electrofishing results, 2003 – 2014.

Relative weight

Mean relative weight (Wr) for each inch group is shown in Figure 5. This measurement is defined as the ratio of fish weight to the weight of a ‘‘standard’’ fish of the same length. The Wr index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth bass relative weights below 80 may indicate a problem of insufficient or unavailable forage; whereas relative weights closer to 100 indicate that sufficient forage is available. Mean relative weights for almost all size classes of largemouth bass from the ARB are at or above the 95 value. Relative weights for 2008, 2013, and 2014 were all above the 100 value. The robust body condition of ARB bass is an indication that bass forage is abundant and available.

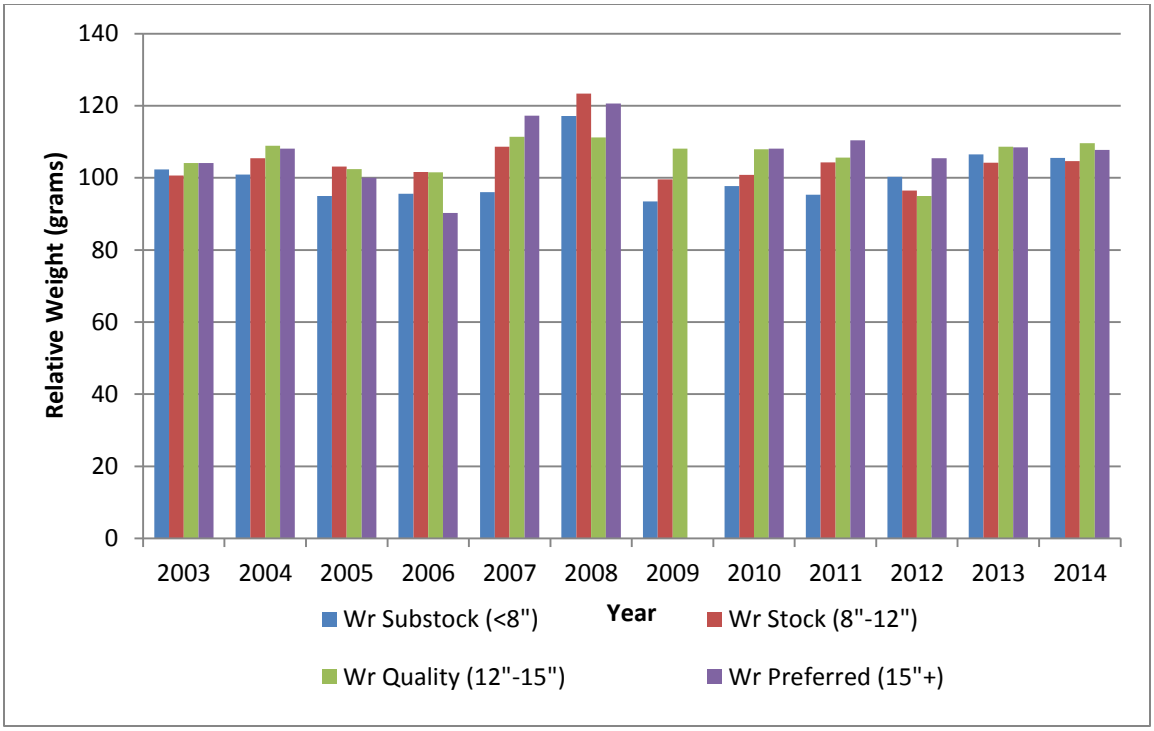

Figure 5. The mean relative weights for largemouth bass by length category from the Atchafalaya Basin, LA for fall electrofishing samples, from 2003-2014 (n=2,628).

Age, growth and mortality

1991 – 2008 analysis

Samples for largemouth bass age and growth analysis have been collected in conjunction with LDWF standardized sampling since 1991. Data in Figure 6 suggests a high level of variability in the average length at capture for each age class of bass in the ARB for the years 1991-2008. The average length at capture did not reach the statewide average for all waterbodies in the state. The average length of age two fish was below the former 14 inch minimum length limit and the average length of age three fish was right above the former minimum length limit. The evaluation results suggested that the minimum length limit did not alter the size structure of the ARB LMB population and increase the number of larger fish.

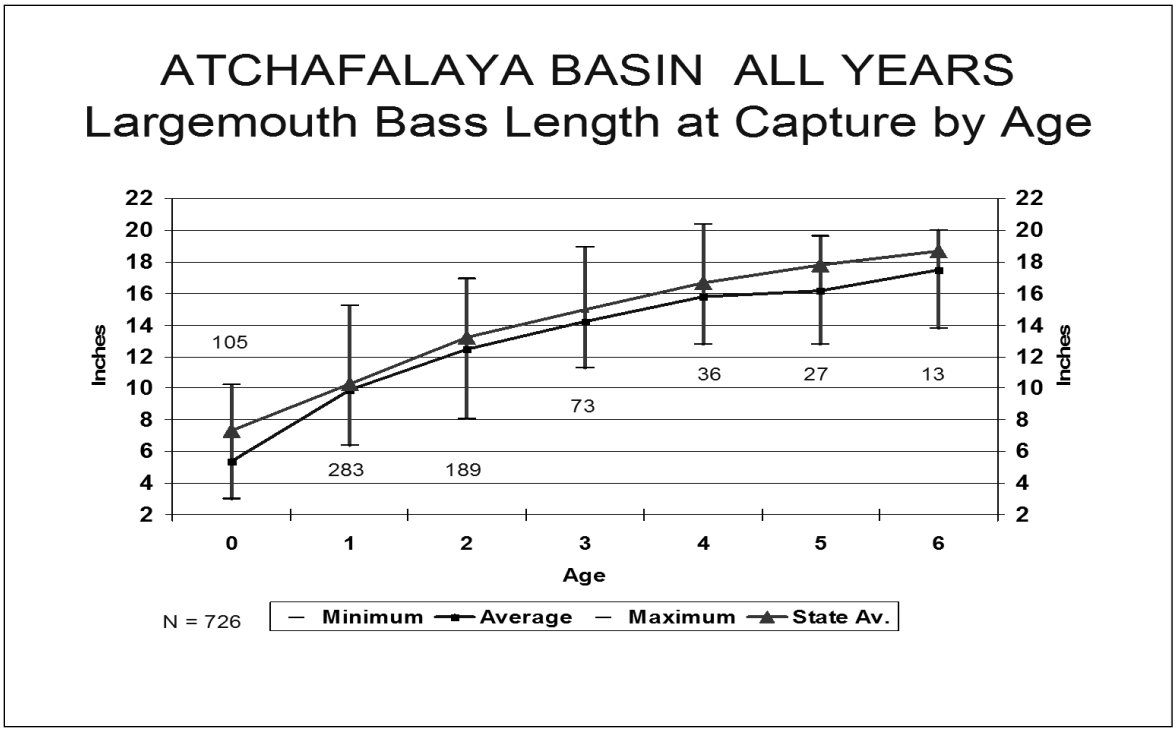

Figure 6. The minimum, maximum, and average length at capture for age of largemouth bass in the Atchafalaya Basin for 1991-2008 combined and the statewide average length at capture for age for all other waters in Louisiana.

2009 – 2011 analysis

From 2009-2011, a total of 446 LMB were sampled for age, growth, and mortality analyses. Sagittal otoliths were removed from ten bass per inch group per year for age analysis. Otolith sections were read by independent readers. Annuli counts were assigned. Biological ages were then estimated by assigning an April 1st birth date. Ages were assigned to fish collected during the 2009-2011 sampling period with age-length-keys (Ricker 1975). Ages were assigned to fish collected from earlier years (1990-2008) strictly as an inverse of the von Bertalanffy growth model. Growth was estimated by fitting the von Bertalanffy model (1938) to the 2009-2011 data. Total instantaneous mortality (Z) was calculated using the descending slope of catch curves (Ricker 1975). Only those age classes with $\geq$ 5 individuals were used in estimation of Z. Assumptions critical to accurate estimation of Z using catch curves includes constant recruitment and mortality in the population. Given the impact of Hurricane Gustav in 2008, and to reduce the impact of the constant mortality assumption, catch curves were only used to estimate Z with the 2011 sample.

Results from the 2009-2011 evaluation indicate an average of 3.4 years is required for ARB LMB to reach 14 inches TL as seen in Figure 7. The age structure of the 2011 electrofishing sample is shown in Figure 8. While bass up to 8 years old were found, only a small percentage of ARB LMB sampled were 3 years old and older. The annual mortality rate and survival rate calculated for the 2011 LMB age data is 73% (Z = -1.29) and 27%, respectively.

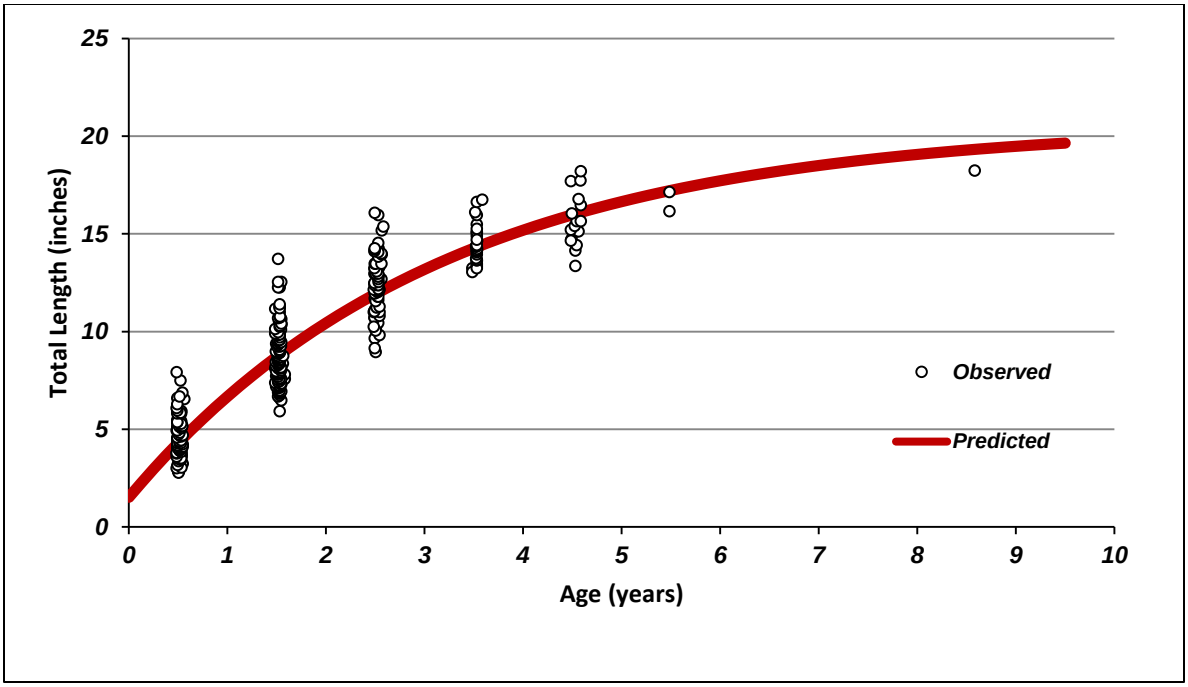

Figure 7. Observed and predicted length-at-age at capture (growth rate) of LMB from the Atchafalaya Basin, LA from 2009-2011 fall electrofishing samples (N=446).

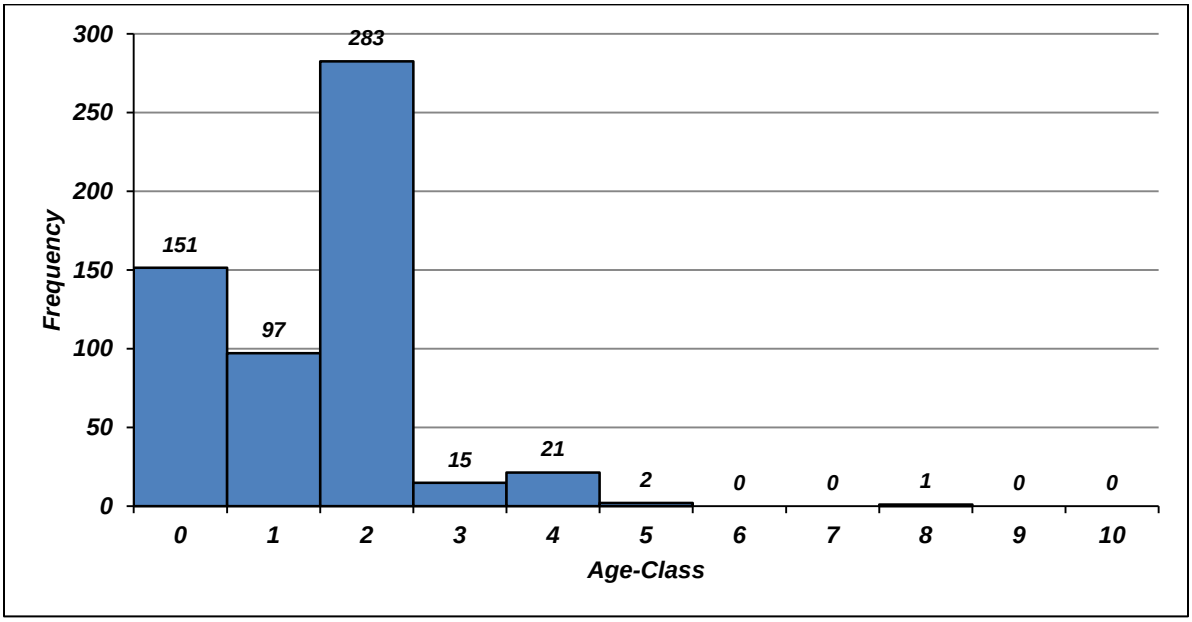

Figure 8. Age class structure of LMB collected from the Atchafalaya Basin, Louisiana for 2011 (n = 570). Few bass older than four years of age were observed in the sample.

Stocking and genetic sampling

Florida largemouth bass (*Micropterus floridanus*) were first stocked into ARB waters in 1992, following the Hurricane Andrew fish kill. These stockings were not designed to supplant the native northern largemouth bass population with Florida genetic stock. These stockings were intended as a response to facilitate the recovery of a population devastated by a massive fish kill. Subsequent to the recovery of the ARB fish population, additional

stockings were conducted with the intention of increasing the opportunity for anglers to catch larger than average bass.

Over 5.6 million Florida bass (FLMB) have been stocked into the Atchafalaya River Basin since 1992 (Table 1). Almost 400,000 FLMB and 193,000 native largemouth bass were stocked post Hurricane Andrew in response to public concern over the massive fish kills that occurred following this storm. In the post storm absence of predation and competition, the FLMB should have become dominant. However, despite such an advantage, this species did not become established. Genetic testing conducted in 2011 indicated that only 9% of the Florida genome was present in the sample (n = 219; Table 2). Additionally, higher CPUE's in 2011 (Figures 1 and 2), along with the genetic results, indicate that the remaining fish population, including native largemouth bass, recovered robustly and that stocking efforts were unnecessary. The stocking of Florida largemouth bass in the adjacent Lake(s) Verret, Grassy, and Palourde system as well as Lake Fausse Point responded similarly; the ineffectiveness to establish this genotype during post hurricane recovery. This tenacity for recovery of native largemouth bass populations has also been noted in other coastal systems including the Calcasieu, Mermentau and Sabine Rivers in southwest Louisiana following Hurricanes Rita (2005) and Ike (2008). These systems received little to no stocking of largemouth bass before and after the hurricane related fish kills, yet yielded record CPUE's after two years of recovery. These observations suggest that native coastal populations of largemouth bass (and other indigenous fish species) have adapted to these periodic storm events and rapid recovery is part of the natural selection process.

Table 1. The known history of stocking events in the Atchafalaya Basin, from 1992 - 2009.

YEAR	Florida Largemouth Bass	Northern Largemouth Bass
1992	394,000 fingerlings	5,000 fingerlings
		1,271 adults
1993		185,022 fingerlings
		1,412 adults
1999	330,811 fingerlings	
2000	647,518 fingerlings	
	451,700 fry	
2001	974,775 fingerlings	
	295,200 fry	
2002	732,224 fingerlings	
	25,457 Phase II fingerlings	
2003	395,347 fingerlings	
	19,401 Phase II fingerlings	

2004	200,251 fingerlings	
2005	27,600 fingerlings	
	12,834 Phase II fingerlings	
2006	213,733 fingerlings	
2007	314,081 fingerlings	
2008	206,069 fingerlings	
2009	401,182 fingerlings	

Electrophoretic analysis of largemouth bass liver tissues is conducted in conjunction with standardized fish sampling. These results, as seen in Table 2, show a range of 0 to 3% pure FLMB genome from the years 1994 to 2013. After the recovery stocking attempts following Hurricane Andrew, Florida largemouth bass were stocked annually from 1999 to 2009. Despite the combined stockings of millions of FLMB, genetic sampling conducted over 14 years indicates that only 12% of the Atchafalaya Basin bass population carried genetic material characteristic of Florida bass. Little, if any increase in Florida bass genetic material was detected despite continued stockings. Because of this, it was determined that stocking Florida bass for the purpose of increasing the FLMB genome was neither effective nor feasible in an area as dynamic as the Atchafalaya Basin. Such results may be disappointing in terms of providing genetic potential for larger bass size, but they are not entirely negative. As mentioned above, the failure of Florida bass establishment provides additional confirmation that the native bass population is particularly resilient, and that recruitment is strong.

Table 2. The results of genetic analysis of largemouth bass from standardized electrofishing samples in the Atchafalaya Basin, 1994 - 2013.

LARGEMOUTH BASS GENETICS					
Year	Number	Northern	Florida	Hybrid	FLMB Influence
1994	186	97%	1%	2%	3%
1995	116	98%	1%	1%	2%
1997	72	97%	0%	3%	3%
2001	154	93%	1%	6%	7%
2003	254	96%	1%	3%	4%
2004	190	91%	3%	6%	9%
2006	64	89%	2%	9%	11%
2007	163	94%	1%	5%	6%
2008	91	90%	0%	10%	10%
2009	295	89%	1%	10%	11%
2010	1084	87.8%	0.2%	12%	12.2%
2011	219	91%	1%	8%	9%
2012	516	95%	0%	5%	5%
2013	450	95%	0%	5%	5%

Creel

Randomized access point surveys of anglers have been conducted by LDWF for thirteen separate creel years beginning in 1989. Much information has been collected about anglers and the results of their fishing trips into the Basin.

Another angler creel survey was recently conducted. This survey began July 1, 2013 and extended through Dec. 31, 2014. The survey method used was a random access point survey of completed fishing trips. The size distribution of angler harvested largemouth bass for the eightteen months (July 1, 2013- Dec. 31, 2014) is presented in Figure 9. The majority of fish harvested were in the 13, 14, and 12 inch groups, respectively. During this time period, it is estimated that 254,874 largemouth bass were caught. Of those, 107,869 were harvested and 147,005 were released. This estimate equates to a 58% release rate. Anglers caught an average of 3.0 bass per fishing trip for a catch rate of 0.65 largemouth bass per hour. The average weight of all bass harvested during the creel survey was 1.5 pounds per fish.

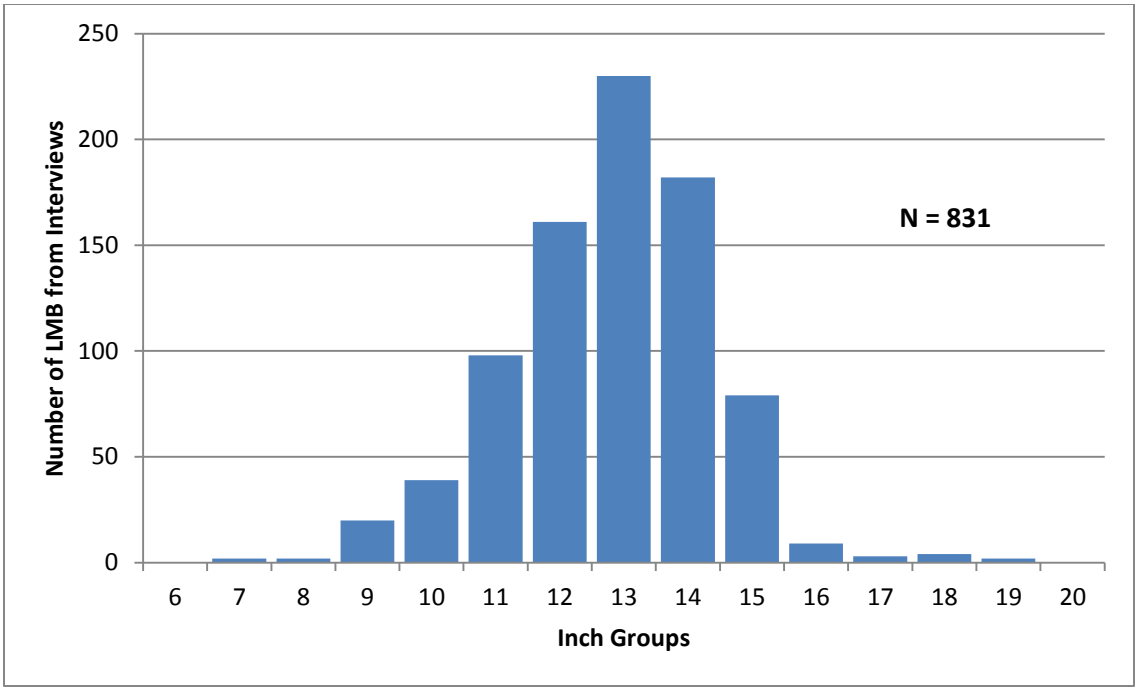

Figure 9. The size distribution (length groups) of angler harvested largemouth bass from the Atchafalaya Basin, LA for July 1, 2013 – December 31, 2014. Data collected from actual angler interviews.

Table 3. Annual averages of the number of bass anglers per fishing party, the length of each fishing trip and the number of one-way miles traveled to boat ramps for all years of creel surveys of the Atchafalaya Basin. (*- data represents 6 months)(^- data represents 18 months)

BASS ANGLERS (1989-91 - no length limit) (14 inch minimum 1993-June, 2013) (July 2013-present - length limit removed)			
Year	Mean no. of anglers in party	Mean trip length (hours)	Mean one-way distance traveled to ramp
1989	1.77	4.28	30.64
1990	1.79	5.75	52.82
1991	1.78	5.80	36.95
1993*	1.82	4.19	18.60
1994	2.00	4.66	27.09
1995	1.85	4.76	35.04
1996*	1.82	5.17	36.02
2003	1.70	5.33	36.92
2004	1.71	5.48	40.92
2008	1.62	4.66	37.24
2009	1.64	4.89	38.10
2013-2014**	1.76	4.69	40.00

*Atchafalaya Basin bass anglers average 1.77 anglers per party and 4.97 hours per trip.
**Average one-way drive to launch their boat is approximately 35.86 miles.

Table 4. Annual data for average weight of largemouth bass harvested and largemouth bass caught, released and harvested per fishing trip by bass anglers for all years of creel surveys in the Atchafalaya Basin. (* - data represents 6 months)(^ - data represents 18 months)

BASS ANGLERS (1989-91 - no length limit) (14 inch minimum 1993-June, 2013) (July 2013-present – length limit removed)				
Year	LMB caught per trip/per hr.	LMB released per trip/per hr.	LMB harvested per trip/per hr.	LMB Av. weight
1989	1.78/0.32	0.98/0.18	0.80/0.14	1.72
1990	4.83/0.86	3.49/0.59	1.35/0.27	1.13
1991	4.93/0.88	3.54/0.65	1.39/0.23	1.15
1993*	2.35/0.48	2.15/0.44	0.20/0.04	2.09
1994	8.95/1.73	8.68/1.68	0.28/0.05	2.14
1995	6.84/1.36	6.32/1.25	0.52/0.11	1.95
1996*	5.38/0.96	4.51/0.81	0.86/0.15	1.96
2003	5.82/0.92	5.39/0.86	0.43/0.06	2.12
2004	4.95/0.86	4.57/0.79	0.38/0.07	2.18
2008	8.18/1.56	7.40/1.41	0.78/0.16	2.11
2009	3.53/0.84	2.92/0.72	0.61/0.11	2.46
2013-2014^	2.46/0.49	1.4/0.28	1.06/0.21	1.48

With the exception of hurricane affected years, bass catch rates and bass release rates were consistently higher under the 14 inch minimum length limit as seen above in Table 4. Harvested bass were also larger, by legal requirement. After extensive review, LDWF Inland Fisheries staff determined that the inherent characteristics of Atchafalaya Basin LMB (slow growth, short life span) and the frequency of environmental events are factors that cannot be mitigated by the 14" minimum length limit. The resulting conclusion was that 14" minimum length limit was not effective to produce increased abundance of larger sized bass.

Link to the report by LDWF:
http://www.wlf.louisiana.gov/sites/default/files/pdf/document/35987-atchafalaya-basin-lmb-technical-report-10-01-2012/atchafalaya_basin_lmb_technical_report_1o-01-2012.pdf

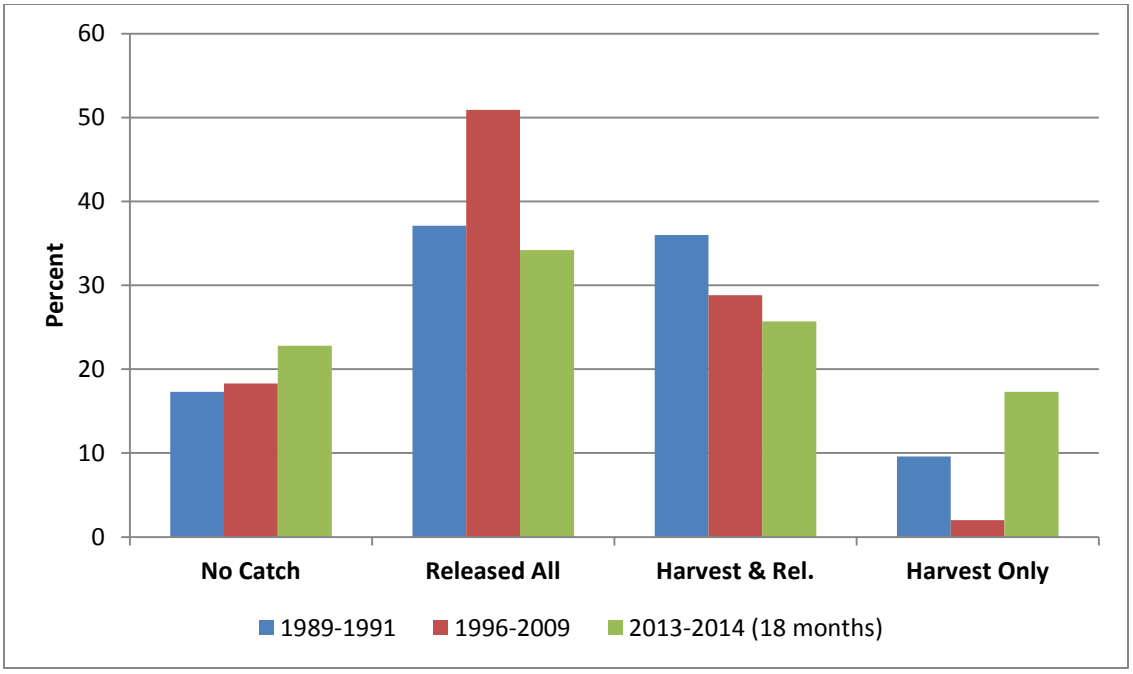

Figure 10. The comparison of bass anglers that caught nothing, released all bass, both harvested and released bass, or only harvested bass for pre-regulation and post 14 inch minimum regulation creel survey years in the Atchafalaya Basin.

As shown in Figure 10, creel census data from 1989, 1990, and 1991, prior to the 14 inch minimum length limit regulation, shows that 17.3 % of bass anglers caught no bass. Those anglers neither harvested nor released any bass. After implementation of the regulation, for 1996, 1997, 2003, 2008 and 2009, 18.3 % of bass anglers caught no bass. Post-regulation change creel census in 2013-2014 shows 22.8% caught no bass. Prior to regulation, 37.1 % of bass anglers released all bass caught. With implementation of the regulation, an increase to 50.8 % was documented. The increase could be attributed to the regulation. After the length limit removal in 2013, angler release of all bass dropped significantly, as might be expected, to 34.2%. Prior to regulation, 36.0 % of bass anglers harvested bass and released other bass. After implementation of the regulation, 28.8 % of bass anglers harvested and released bass. These 2013-2014 numbers from post-regulation dropped to 25.7%. The regulation appears to have also been responsible for the reduction in number of anglers practicing total harvest with no release from 9.6% to 2%, and then a very sharp rise to 17.3% post-regulation.

Forage

Forage is available in the Basin in many forms. Small fish are one form. The other and most abundant is invertebrates, including crawfish and shrimp. Production of red swamp crawfish (*Procambarus clarkii)* and white river crawfish (*Procambarus zonangulus)* is directly related to river flood pulse and is to such an extent that millions of pounds may be harvested (Figure 18). Shrimp are also abundant, including river shrimp (*Machrobrachium ohione)* and grass shrimp (*Palaemonetes spp.*).

Table 5 shows that abundance of forage fish of all species, 5 inches or less, has remained consistently high in electrofishing forage samples. Rotenone samples in 1998 had results of

5046.25 fingerlings per acre. With all of this forage observed on an annual basis, there should be no lack of food available for predacious fish.

Table 5. The catch-per–unit-of-effort (number per hour) of forage samples for all species less than or equal to 5 inches total length for the Atchafalaya Basin from 1993 - 2008.

ELECTROFISHING FORAGE SAMPLE ALL SPECIES ≤ 5 INCHES CATCH PER HOUR													
Year	1993	1994	1995	1996	1997	1998	1999	2001	2004	2005	2006	2007	2008
CPUE	424.0	80.0	144.0	448.0	884.5	808.9	568.0	1348.8	633.6	540.0	3353.6	935.3	589.3

Crappie

Creel Census

Crappie anglers in the ARB tend to fish in pairs for an average period of 5 hours after having driven approximately 35 miles to launch their boat (Table 6.).

Table 6. Annual averages of the number of crappie anglers per fishing party, the length of each fishing trip and the number of one-way miles traveled to boat ramps for all years of creel surveys of the Atchafalaya Basin.

CRAPPIE ANGLERS			
Year	Mean no. of anglers in party	Mean trip length (hours)	Mean one-way distance traveled to ramp
1989	1.96	4.40	36.49
1990	2.06	5.93	35.42
1991	1.81	6.56	37.89
1993	1.80	4.97	25.38
1994	1.95	4.50	30.19
1995	1.99	4.64	35.24
1996	1.89	5.09	34.76
2003	1.82	4.99	35.03
2004	1.90	4.67	45.12
2008	1.59	4.46	38.63
2009	1.61	4.48	32.00

Crappie harvested from the ARB have consistently averaged approximately one half pound per fish over the years. The best year for crappie fishing was in 1991, where the average harvest was 15 per trip. Some of the lowest averages for harvest of fish per trip occurred in the wake of hurricanes in 1992, 2005, and 2008 (Table 7). Harvest numbers for 2009 came back up significantly at 7 fish caught per trip. This number was the 3rd highest catch rate during all years of creel.

Table 7. Annual average weight of crappie harvested and crappie caught per fishing trip by crappie anglers for all years of creel surveys in the Atchafalaya Basin.

CRAPPIE ANGLERS		
Year	**Crappie caught per trip/per hour**	**Av. Weight (lbs.)**
1989	5.17/1.04	0.52
1990	4.24/0.72	0.36
1991	15.24/2.29	0.44
1993	2.97/0.59	0.54

1994	2.10/0.42	0.65
1995	4.02/0.77	0.46
1996	5.11/0.86	0.51
2003	7.41/1.37	0.54
2004	4.51/0.84	0.45
2008	1.48/0.26	0.69
2009	7.00/1.41	0.61

In all creel surveys conducted, crappie anglers in the ARB on average harvested more 8 inch crappie than all other size classes as shown in Table 8.

Table 8. The length frequency of crappie harvested by crappie anglers for all years of creel surveys in the Atchafalaya Basin.

Percent of Crappie Harvest by Inch Group by Crappie Anglers									
Year	**6”**	**7”**	**8”**	**9”**	**10”**	**11”**	**12”**	**13”**	**14”**
1993	0.8	13.9	27.8	18.7	19.5	12.7	5.8	0.5	0.3
1994	5.5	13.7	19.9	19.1	15.4	15.5	7.8	2.5	0.4
1995	1.3	17.1	37.4	25.6	9.4	4.2	3.8	0.8	0.2
1996	1.5	16.5	30.0	27.4	14.6	6.2	2.7	0.6	0.2
2003	1.9	20.0	23.8	19.1	12.7	12.5	7.0	2.3	0.5
2004	0.4	15.9	43.5	22.2	10.6	3.8	2.4	0.9	0.2
2008	3.3	14.4	23.7	24.9	14.1	10.1	7.1	2.3	0.3
2009	0.0	3.42	26.65	35.99	19.59	8.43	5.47	0.46	0.0
Average	1.8	14.4	29.1	24.1	14.5	9.2	5.3	1.3	0.3

Relative abundance and size distribution

Black crappie is the prominent species of crappie collected by electrofishing in the ARB. The results of electrofishing are extremely variable for all years, but the effects of hurricane-related fish kills are clearly evident. Figure 11 shows the total CPUE of black crappie over the last 12 years sampled in the ARB. Electrofishing results show that 2011 was an exceptional year for black crappie in the ARB. The mean catch rate of 104 crappies per hour is the highest rate ever recorded since electrofishing efforts began.

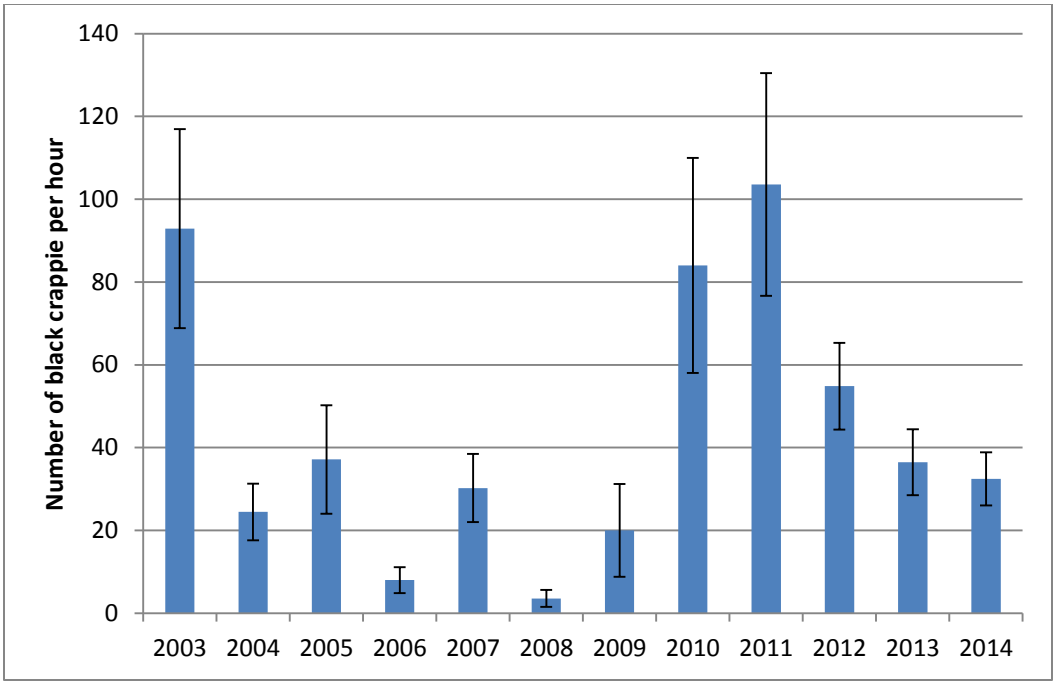

Figure 11. The mean total CPUE (+ SE) for black crappie from the Atchafalaya Basin, LA from fall electrofishing results for 2003-2014.

Black crappie catch indices show consistently lower catch rates from 2004-2009 with an increased number of stock-size crappie (5-8 inch) collected in 2010 (Figure 12). The population appeared slow to recover after the 2008 hurricane season, but a strong year class from 2010 can be followed into 2011 for one of the highest quality (8-10 inch) year classes collected.

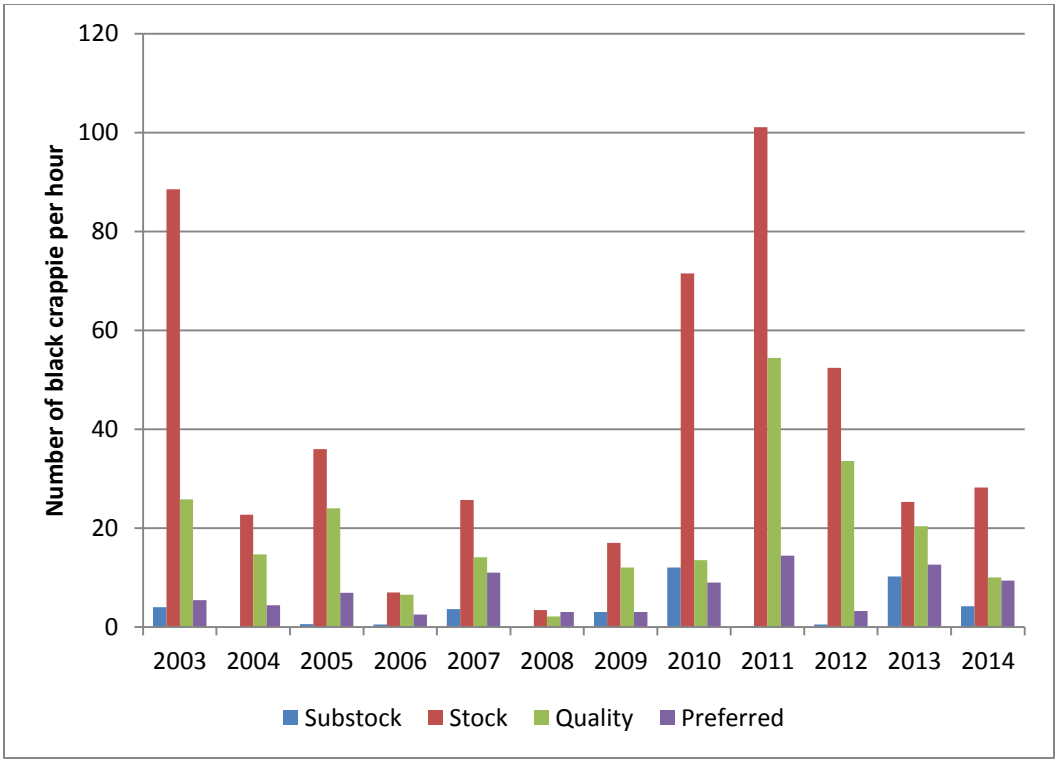

Figure 12. The CPUE for sub-stock-, stock-, quality- and preferred-size black crappie from the Atchafalaya Basin, LA for fall electrofishing results 2003-2014.

Size distribution for black crappie in 2014 is shown in Figure 13. The majority of fish collected were from the sub-stock (< 5 inches) range, at 13.4 fish per hour. The quality- (8-10 inch) and the preferred-size (10-12 inch) range were collected at 6.7 and 7.3 fish per hour, respectively.

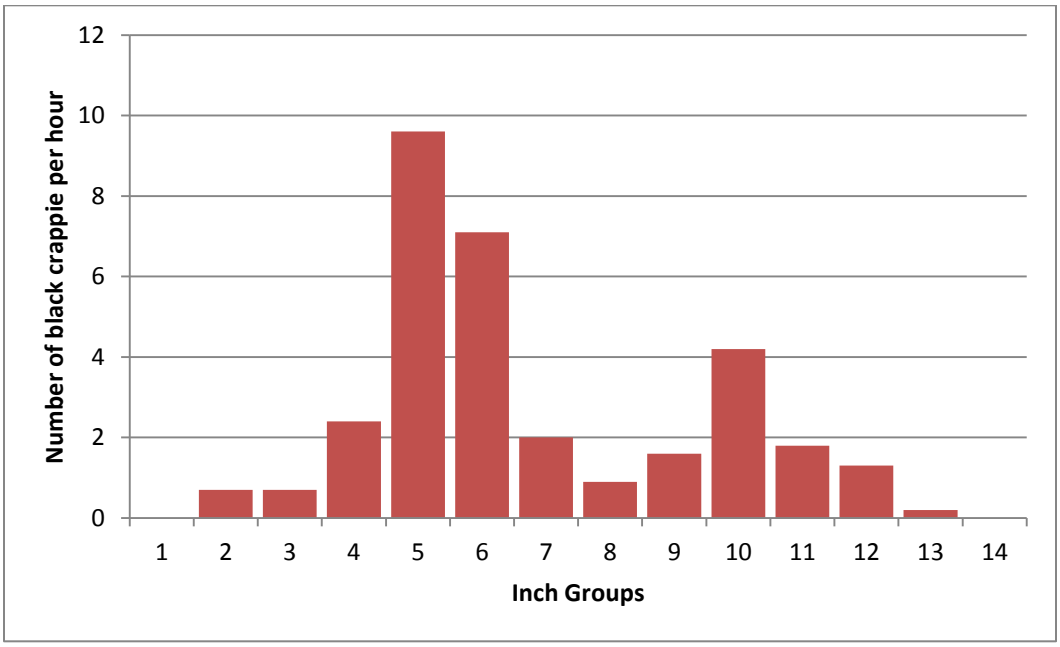

Figure 13. Size distribution for black crappie in the Atchafalaya Basin, LA for fall 2014 (n=146).

Age and growth for Crappie

Figure 14 shows age and growth data for crappie that were collected during fall standardized electrofishing efforts in the ARB for the years 1990-2008. Since black crappie is the predominant species of crappie sampled in the ARB, age and growth is presented for this species alone. These data illustrate why 8 to 9 inch crappie are the most commonly harvested size from the ARB (Table 8). Most 8 and 9 inch crappie are between 2 and 3 years of age, with a portion of age 1 fish also reaching those lengths.

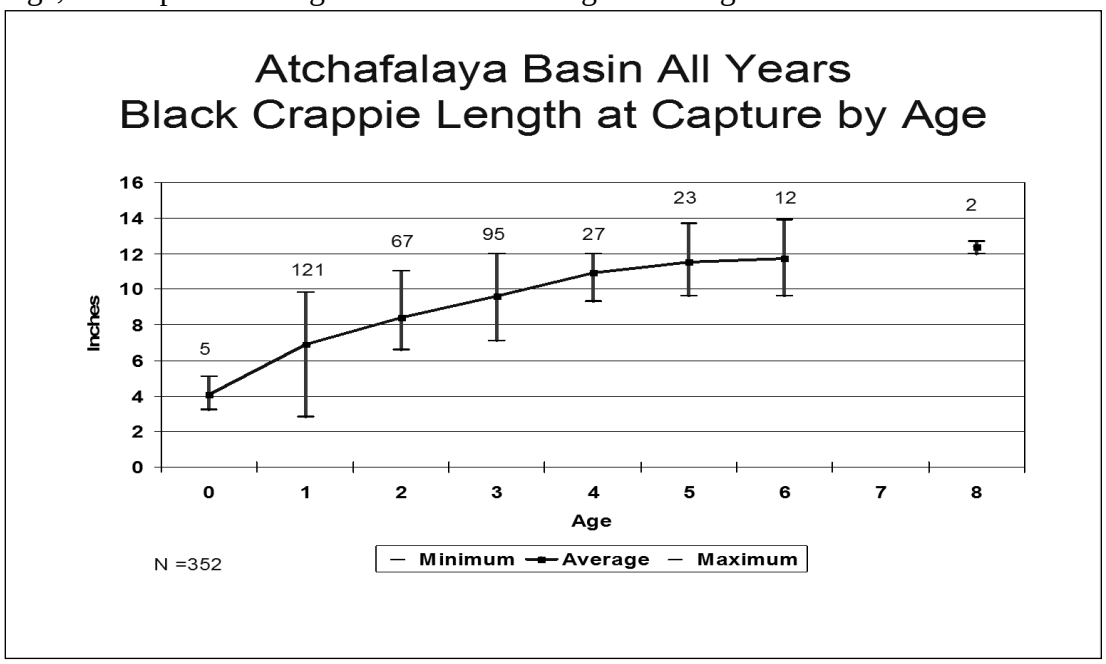

Figure 14. The average, minimum and maximum total length at capture for age of crappie combined for all years (1990-2008) of standardized fall electrofishing samples in the Atchafalaya Basin.

Based on the historical data, it is apparent that ARB anglers prefer quantity over quality with regard to crappie harvest. Management efforts, including current harvest regulations (no minimum length limit - 50 fish daily limit) routinely provide for that angler preference. Though legal, few anglers manage to harvest the daily 50 fish limit. The flood-drought cycle of the ARB is likely the largest factor of influence for crappie production.

Commercial

Commercial anglers are consistently encountered during creel surveys in the ARB as can be seen in Table 9. Hoop net anglers, gill net anglers, and trotline anglers are the predominant angler types. Commercial crab fishers are encountered in late spring to early winter as they utilize a fishery that exists only during low-water periods. Commercial bowfin anglers harvest for the egg/caviar industry in December, January, and February during the peak bowfin spawn.

Table 9. The estimated number of trips by type of activity from creel surveys conducted in the Atchafalaya Basin from July, 1993 to December, 1996.

User trip estimates from creel surveys.	1993 6 Months (Jul – Dec)	1994 12 Months	1995 12 Months	1996 6 Months (Jan – Jun)
Commercial Fishermen	16,873	33,119	40,251	15,653
Commercial Crawfishermen	46,259	137,538	99,700	59,438
Commercial Crabbers		4,642	10,864	1,190
Estimate of All User Groups	189,882	517,457	550,628	203,987
NOTE – VALUES ABOVE ARE DAILY TRIPS				

One fishery that is not as well known is that of river shrimp (*Machrobrachium ohione*) harvested from traps fished in the main river channel. Catfish anglers also use bush lines to capture this popular trotline bait. Hanging a wax-myrtle bush at the water's edge on the main channel provides a place of refuge for river shrimp. The anglers return in the morning and "shake" the bush into a dip net to capture the resting river shrimp.

There are commercial catfish processors in operation around the ARB. They have been in business since at least 1988. Though it is difficult to isolate reported landings for the ARB, it is possible to look at reports by parish surrounding the ARB to make an estimation of commercial catfish production.

LDWF standardized gill net sampling in the ARB produces consistent catch rates of catfish (Figure 15.) and smallmouth buffalo (Figure 16). Smallmouth buffalo catch rates during the 2013-2014 season sharply increased to more than double the pounds per night than any other year over the past decade. Catch rates returned closer to average numbers the following year.

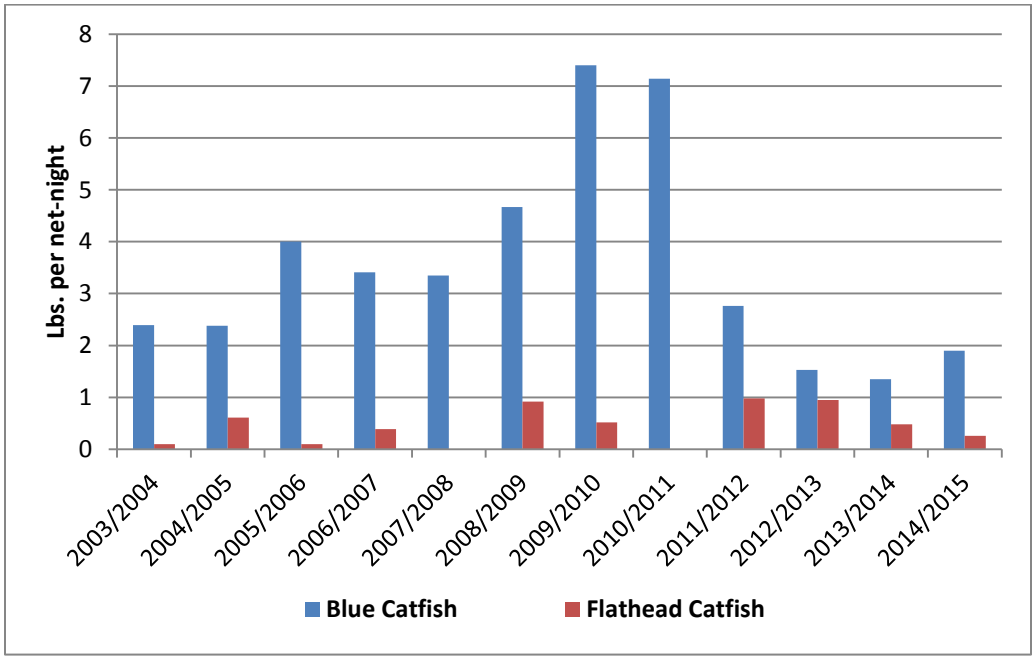

Figure 15. The catch-per-unit-effort (pounds per 100 feet of webbing per net night) of flathead catfish and blue catfish for all gillnet mesh sizes (2.5, 3.0, 3.5, and 4.0 inch bar) combined for each year (2003-2015) of standardized sampling.

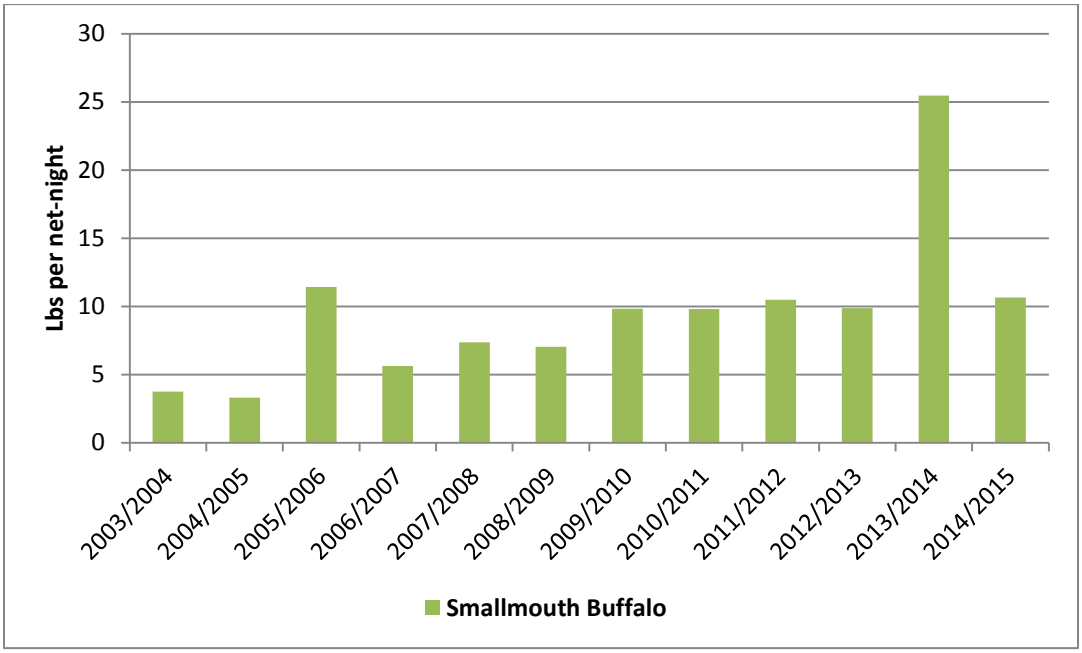

Figure 16. The CPUE (pounds per 100 feet of webbing per net night) of smallmouth buffalo for all gillnet mesh sizes (2.5, 3.0, 3.5, and 4.0 inch bar) combined for each year (2003-2015) of standardized sampling.

Non-confidential reports of landings from LDWF commercial trip ticket data are available to show the approximate pounds of the commercial harvest from the ARB (Tables 10 – 15). These data are not completely specific to waters only inside the levees but are representative of the area. It is assumed that the ARB, due to the expanse of the area, is a major contributor to these numbers.

LDWF Trip Ticket Data for Commercial Landings
Species total pounds reported and value by year

Table 10. The annual landings and the value of landings of bowfin, buffalo, bullhead catfish, and common carp for the years 2000 to 2014.

Species	Bowfin		Buffalo		Bullheads		Common carp	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	34,978	$21,244	72,392	$9,830	-	-	2,367	$209
2001	12,580	$10,898	449,680	$47,874	0	0	18,281	$1,531
2002	53,976	$43,086	107,655	$12,092	-	-	3,802	$362
2003	81,746	$52,769	280,594	$33,968	-	-	22,111	$2,190
2004	54,047	$37,788	345,560	$43,313	1,394	$218	23,321	$2,638
2005	141,548	$136,031	513,361	$61,927	27,681	$2,804	23,355	$2,878
2006	85,698	$92,803	466,489	$59,727	-	-	5,924	$574
2007	45,312	$51,825	621,541	$977,260	-	-	-	-
2008	219,899	$247,480	382,032	$49,761	-	-	1,262	$1,175

2009	63,265	$37,285	374,182	$48,154	0	0	0	0
2010	146,937	$77,596	418,647	$58,057	0	0	-	-
2011	262,474	$144,607	422,462	$58,447	-	-	-	-
2012	102,237	$72,754	302,330	$41,305	-	-	-	-
2013	413,837	$280,561	315,731	$44,510	-	-	36,369	$5,751
2014	412,588	$307,462	310,876	$95,470	-	-	-	-
"-" = Confidential non-reportable, "0" = No landings								

Table 11. The annual landings and the value of landings of blue catfish, channel catfish, and flathead catfish for the years 2000 to 2014.

Species	Blue catfish		Channel catfish		Flathead catfish	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	311,793	$148,035	213,803	$97,790	35,957	$16,620
2001	205,250	$87,408	137,998	$57,721	37,795	$16,137
2002	316,656	$142,165	242,388	$105,507	34,296	$13,931
2003	205,947	$92,890	91,735	$41,260	26,626	$13,102
2004	195,867	$88,582	482,255	$196,604	41,925	$19,979
2005	150,232	$68,980	256,206	$104,041	41,016	$20,090
2006	152,101	$70,833	213,581	$95,417	42,198	$20,295
2007	235,912	$101,347	91,095	$38,054	59,546	$27,663
2008	120,494	$57,282	42,975	$20,232	31,312	$16,991
2009	95,213	$49,024	63,241	$31,479	29,015	$15,451
2010	163,379	$73,177	43,113	$18,859	30,520	$14,807
2011	245,552	$114,954	115,776	$58,104	29,001	$14,271
2012	192,163	$89,763	153,178	$76,874	15,726	$8,085
2013	192,028	$81,262	140,877	$69,006	22,074	$15,361
2014	252,941	$122,000	74,899	$34,465	27,387	$15,448
"-" = Confidential non-reportable, "0" = No landings						

Table 12. Annual landings and the value of landings of garfish for the years 2000 to 2014.

Species	Unclassified gar		Longnose gar		Shortnose gar		Alligator gar	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	439	$476	5,326	$5,173	-	-	310	$301
2001	0	0	2,152	$2,087	0	0	-	-
2002	-	-	-	-	0	0	3,287	$1,936
2003	0	0	-	-	0	0	3,194	$2,585
2004	-	-	1,548	$696	0	0	9,904	$8,297
2005	-	-	945	$809	0	0	9,483	$7,671
2006	-	-	-	-	0	0	35,730	$40,540
2007	0	0	947	$704	0	0	7,201	$5,524
2008	-	-	176	$64	0	0	-	-

2009	0	0	0	0	0	0	5,181	$2,219
2010	-	-	-	-	-	-	-	-
2011	-	-	-	-	0	0	13,381	$7,160
2012	0	0	0	0	0	0	-	-
2013	-	-	0	0	0	0	2,757	$1,677
2014	0	0	-	-	0	0	12,732	$8,968
"-" = Confidential non-reportable, "0" = No landings								

Table 13. The annual landings and the value of landings of shad and freshwater drum for the years 2000 to 2014.

Species	Gizzard shad		Unclassified shad		Freshwater drum	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	-	-	125,041	$14,385	13,555	$2,185
2001	27,470	$3,220	726,882	$74,083	21,244	$3,172
2002	14,255	$1,712	174,193	$23,610	7,961	$1,210
2003	205,464	$28,991	142,606	$20,762	8,908	$1,331
2004	160,018	$22,212	130,824	$18,157	26,404	$5,640
2005	200,703	$31,443	220,365	$34,870	17,383	$4,221
2006	27,939	$3,338	156,276	$24,716	23,563	$5,010
2007	125,227	$20,779	224,989	$36,303	19,923	$5,020
2008	185,723	$34,946	345,123	$63,555	19,060	$4,359
2009	-	-	52,874	$19,041	15,748	$3,643
2010	-	-	15,947	$3,141	13,487	$3,265
2011	45,378	$9,038	213,888	$58,227	8,267	$1,981
2012	37,409	$7,457	101,269	$28,387	5,654	$1,510
2013	59,886	$12,463	233,692	$68,234	8,084	$2,109
2014	102,177	$24,680	434,383	$95,795	14,172	$3,778
"-" = Confidential non-reportable, "0" = No landings						

Table 14. The annual landings and the value of landings of grass, silver, and bighead carp for the years 2000 to 2014.

Species	Grass carp		Silver carp		Bighead carp	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	-	-	0	0	0	0
2003	-	-	0	0	0	0
2004	-	-	-	-	0	0
2005	-	-	0	0	0	0
2006	-	-	0	0	-	-
2007	0	0	0	0	0	0

2008	-	-	0	0	-	-
2009	0	0	0	0	0	0
2010	-	-	-	-	-	-
2011	-	-	-	-	-	-
2012	-	-	-	-	0	0
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
"-" = Confidential non-reportable, "0" = No landings						

Table 15. The annual landings and the value of landings of blue crab and wild crawfish for the years 2000 to 2014.

Species	Blue crab		Wild crawfish	
Year	Lbs.	Value	Lbs.	Value
2000	256,186	$139,685	365,391	$639,649
2001	189,177	$121,369	8,899,014	$7,277,948
2002	157,275	$74,844	11,883,865	$6,244,166
2003	74,392	$57,982	6,412,974	$3,777,043
2004	42,704	$179,001	6,793,955	$3,869,911
2005	143,702	$72,688	13,418,851	$7,380,863
2006	86,496	$56,392	1,326,275	$1,173,635
2007	42,431	$35,707	12,792,134	$7,248,526
2008	90,615	$82,955	11,677,381	$7,023,178
2009	84,174	$66,141	14,256,965	$11,638,450
2010	37,706	$33,007	11,100,487	$10,426,904
2011	10,297	$11,641	5,147,817	$5,682,147
2012	65,097	$80,912	5,252,706	$6,413,278
2013	112,021	$151,793	14,160,997	$11,969,975
2014	14,369	$35,446	9,865,327	$12,297,512
"-" = Confidential non-reportable, "0" = No landings				

Table 15 shows the reported harvest of crawfish from the ARB. Crawfishermen fish with baited wire traps in the overflow swamp in response to the flood cycle of the river. Figures 17 and 18 below show the relationship between crawfishermen contacts at creel surveys and the monthly average river stage at the Butte la Rose gauge. For creel years 1993 to 1996, interviews were conducted at 3 different ramps per creel day. The number of crawfishermen was adjusted to the number of contacts per ramp per day to compare numbers with later creel years, 2003, 2004, 2008, and 2009, where only one ramp was surveyed per day.

The flood stage has a two-fold effect on the crawfishing industry. The flooded burrows of the previous year's population of crawfish trigger the release of the offspring that were carried into the burrows as eggs. The amount of inundated area related to the intensity and

duration of the flood stage increases the amount and longevity of access to the new crop by the fishermen.

Some crawfishermen are reported to fish as many as 400 traps. Typically, about 100 are checked per day on a rotating basis. Historically, crawfishermen had unrestricted access to flooded lands in the ARB. Many fishermen were, and still are fishing over flooded private property. This issue is becoming increasingly controversial. Some landowners have begun leasing fishing rights to specific fishermen. The United States 5th Circuit Court of Appeals ruled that there are no states or federal rights to fish on private property when it is flooded by a navigable waterway (Appendix III (Parm vs. Shumate). The ruling may have an effect on the ARB crawfishing industry in the future. Others argue that State vs. Placid Oil Company, 1973, implied that state waters extended to the high water mark and that fishing is allowed in all waters below the high water mark. Time will tell how the issue of access to waters covering private property will be resolved.

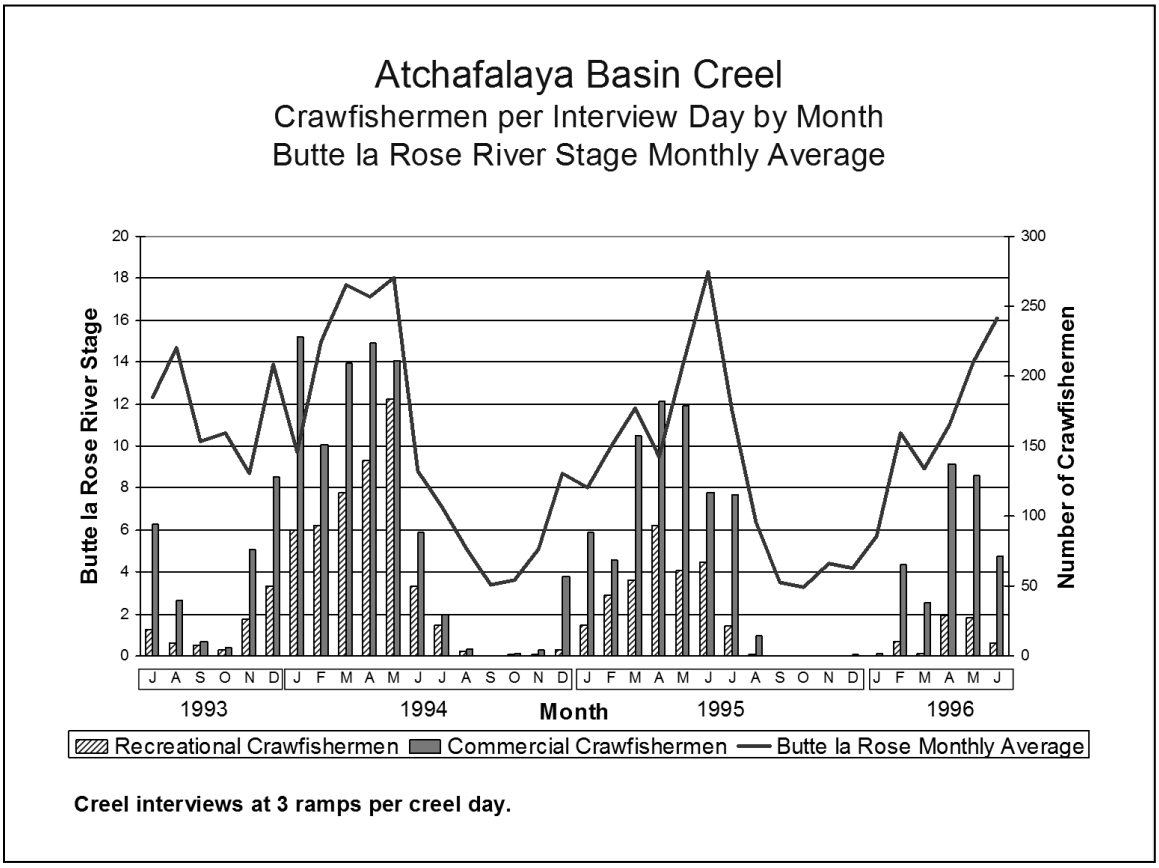

Figure 17. A comparison of the number of crawfishermen interviewed per day by month compared to the monthly average river stage at the Butte la Rose gauge on the Atchafalaya River from July, 1993 to December, 1996.

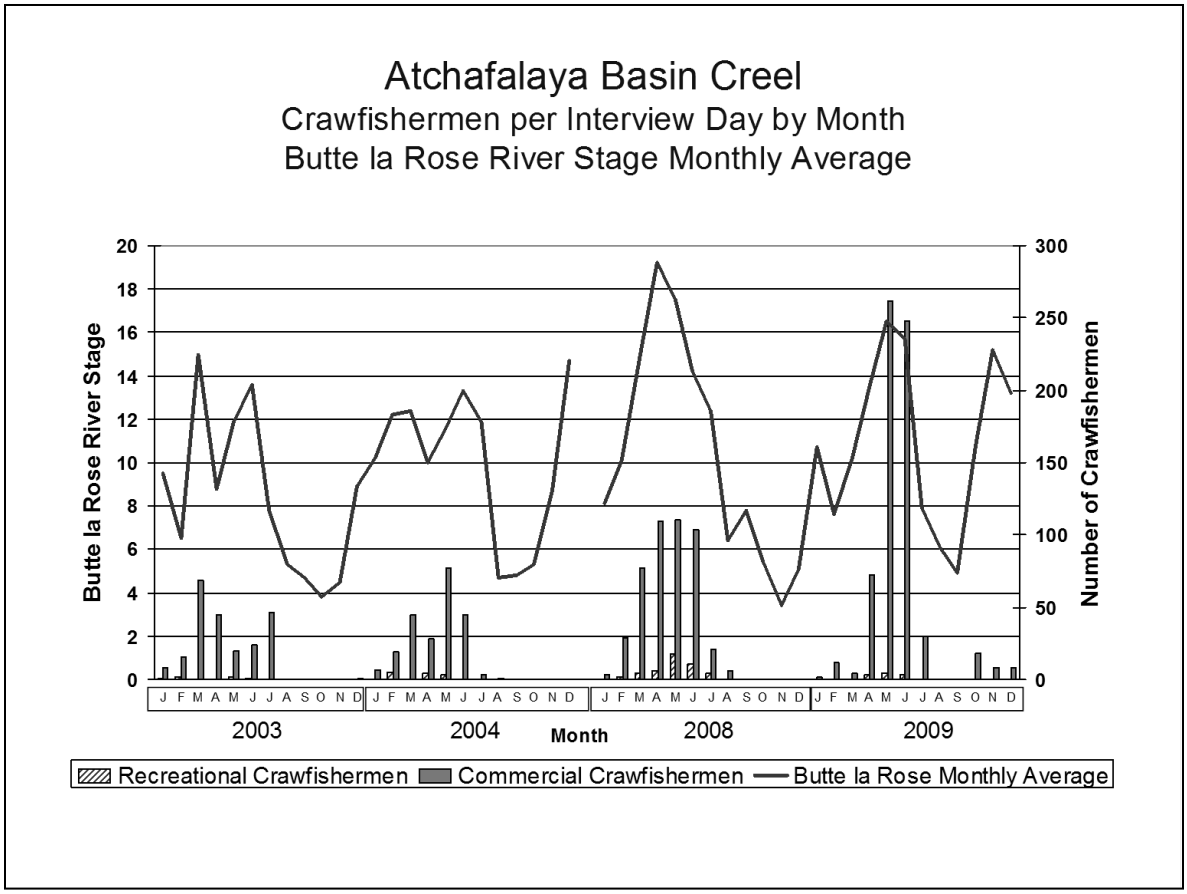

Figure 18. A comparison of the number of crawfishermen interviewed per day by month compared to the monthly average river stage at the Butte la Rose gauge on the Atchafalaya River from January, 2003 to December, 2009.

Figure 19 shows the number of crawfish sacks harvested per trip by month compared to the Butte la Rose daily river stage. It is apparent that a river rise increases the harvest of crawfish in the Basin.

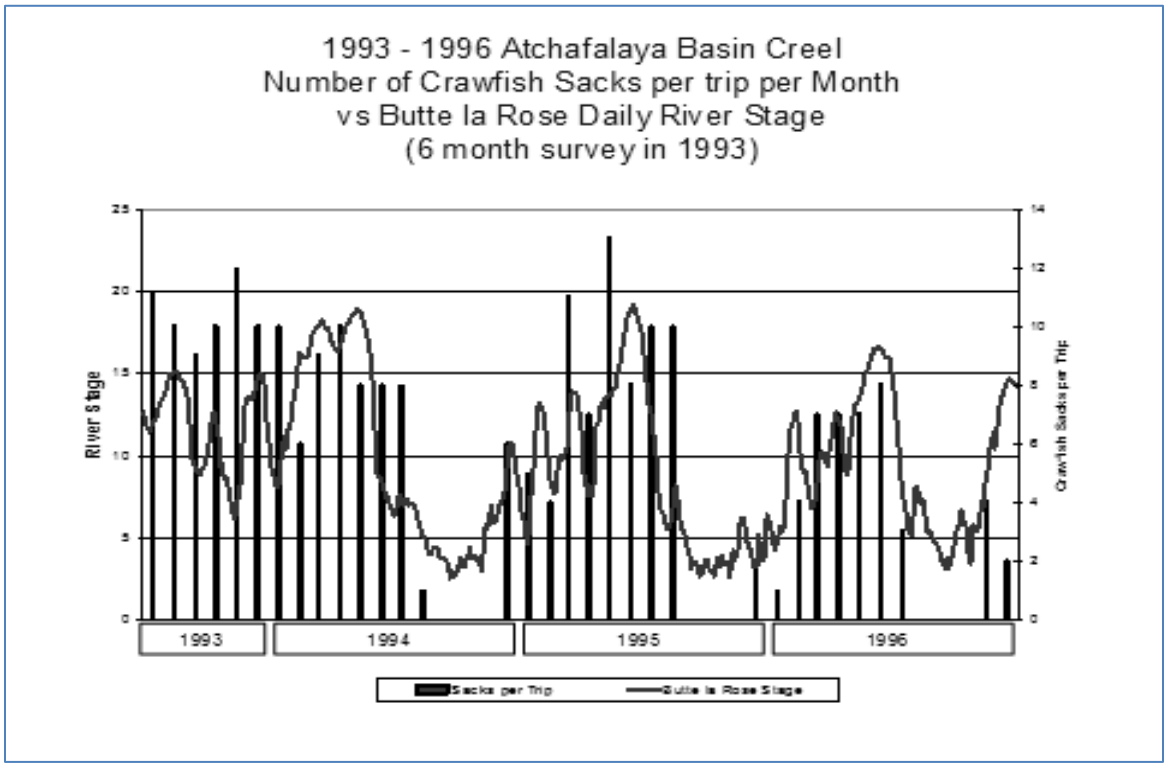

Figure 19. A comparison of the number of sacks of crawfish harvested by month compared to the monthly average river stage at the Butte la Rose gauge on the Atchafalaya River from July, 1993 to December, 1996.

Species of Special Concern

The pallid sturgeon (*Scaphirhynchus album*) is a species that has been captured at the Old River Control structure near Simmesport, LA. Although none have been captured in standardized sampling in the lower Basin, it is assumed to occur in the lower Atchafalaya River as well. The determination of endangered status for the pallid sturgeon was enacted in 1990. More information about this listed species can be found on the USFWS website at the following link. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E06X

Effective October 1, 2010 the shovelnose sturgeon (*Scaphirhynchus platorynchus*) became listed as a threatened species due to similarity in appearance to the pallid sturgeon. Information from the Federal Register announcing the proposal and eventual listing can be found at the following USFWS link.
http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E0BD

Paddlefish (*Polyodon spathula*) are routinely captured in standardized gill net sampling in the Atchafalaya Basin. They are listed as Louisiana state status S3, or rare and local throughout the state or found locally (even abundantly at some of its locations) in a restricted region of the state, or because of other factors making it vulnerable to extirpation (21 to 100 known extant populations). More information can be found on this status at the following link.
http://www.wlf.louisiana.gov/sites/default/files/pdf/fact_sheet_animal/32190-Polyodon

HABITAT EVALUATION

Habitat is the principal factor of influence to all fish populations. Projects designed for flood control and navigation have altered the natural hydrology of the ARB and are responsible for cumulative negative impacts. The effects of natural events including flood pulse and hurricanes are more acute and are just as significant as they are unpredictable.

Hydrology

The Louisiana Department of Natural Resources (LDNR) directs the development of the state master plan for the Atchafalaya River Basin. The program operates under the authority of Act 3 of 1998 and Act 920 of 1999. LDNR, the federal U.S. Army Corps of Engineers, and the ARB parishes create projects to protect and enhance the ARB. The Department of Wildlife and Fisheries also works as part of the program.

Former Louisiana Governor Mike Foster directed LDNR to be the lead agency in the development of the ARB in 1996. In 1999, the Louisiana Legislature unanimously approved the State Master Plan for the Atchafalaya River Basin Program and $85 million, subject to future appropriations, over 15 years for access, easements, water management, and recreation projects.

The Louisiana Legislature adopted Act 606 in 2008, authorizing the Secretary of the LDNR, through the Atchafalaya Basin Program, to submit to the legislature each year an Annual Plan for the Basin that will include water management and access projects, such as boat launches, and other projects consistent with the mission statement of the Atchafalaya Basin Master Plan. Act 606 also creates the Atchafalaya Basin Conservation Fund. Presently, the program in place coordinates multi-agency efforts to change the hydrology in the Basin. Housed in the LDNR, the Atchafalaya Basin Program brings a broad spectrum of stakeholders together to receive, evaluate, design, and request funding for various projects between the guide levees that will have an effect on the total hydrology of the ARB.

The Technical Advisory Group (TAG) receives and also initiates proposed projects in the ARB. Only upon approval by the TAG committee are proposed projects forwarded to the Atchafalaya Basin Research and Promotion Board for consideration. Projects approved by the Board are reviewed and approved by Coastal Wetlands Protection and Restoration Authority. After passing this review, projects are sent to the Louisiana Legislature for consideration. An important tool for evaluation of proposed projects is the Atchafalaya Basin Natural Resource Inventory and Assessment Tool. The tool is programmed to consider that projects in the Basin have potential to affect the entire Basin and provides a means for scientists to evaluate and prioritize project proposals.

The Louisiana Department of Natural Resources has authority over all surface water withdrawals for commercial purposes as per the Surface Water Management Act – La. RS 30:961-963 (Act 955 of the 2010 legislative session).
The link below provides more information on the DNR Surface Water Management Program
http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=92

Aquatic Vegetation

Annual vegetation estimates show that approximately 50,000 acres of the Lower Atchafalaya Basin has aquatic plant coverage. A large portion of the coverage is composed of invasive species. Approximately 60% are floating plants consisting primarily of water hyacinth (*Eichhornia crassipes),* common salvinia (*Salvinia minima),* giant salvinia *(Salvinia molesta)*and duckweed *(Lemna minor).* Approximately 30% are submersed plants which consist primarily of hydrilla *(Hydrilla verticillata),* coontail *(Ceratophyllum demersum),* and fanwort *(Cabomba caroliniana).* Approximately 10% are emergent plants such as alligator weed *(Alternanthera philoxeroides),* water primrose (*Ludwigia* spp.*),* and sedge *(Carex* spp.*).* The floating invasive species (water hyacinth and salvinia) are the biggest problem species. It is not uncommon for either to completely cover navigable bayous and canals, limiting or even denying boating access.

Aquatic plant control is conducted by LDWF and private contractor spray crews who apply herbicides that are EPA approved for use in aquatic areas. Spray crews in the Lower Atchafalaya Basin spray approximately 4,000 acres of aquatic weeds annually. The infestations targeted for spraying consist of approximately 90% water hyacinth and 10% emergent species. Water hyacinth is controlled with 2,4-D (0.5 gal/acre) and a non-ionic surfactant (1 pint/acre). Common and giant salvinia are controlled with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Aqua King Plus (0.25 gal/acre) and Air Cover (12 oz./acre) surfactants from April 1 to October 31. Outside of that time frame, diquat (0.75 gal/acre) and a non-ionic surfactant (0.25 gal/acre) are used. Sedge is controlled with the aforementioned salvinia treatments if it is associated with those plants. If it is targeted specifically, 2,4-D is used in conjunction with a non-ionic surfactant (1 pt./acre). All LDWF spray crews apply herbicides in accordance with the approved LDWF Aquatic Herbicide Procedures.

The Department has introduced giant salvinia weevils through infested giant salvinia plant material to serve as an aid in controlling infestations of the plant. Since the summer of 2007, almost 100,000 weevils have been released on salvinia infestations in the Atchafalaya Basin. These areas include, Bayou Postillion, Bayou Pigeon, Bayou Cowan, Old River, Shell Fields, and Bayou Long areas. Weevil damage to salvinia plants has been observed in and around the release sites. Recent surveys have shown that the weevils have survived the winters and are spreading into new areas where salvinia infestations are present. The most recent release was conducted in April of 2015, where an estimated 21,000 giant salvinia weevils were released in the south-eastern portion of the Basin, west of Adam's landing, known as the Checkerboard. Another 7,000 estimated weevils were released along the western protection levee near the Bayou Benoit area.

During the fall of 2013, LDWF contracted private applicators to spray additional areas around the lower Grand Lake/Swing Chute area. Private applicators treated 300 acres of water hyacinth using 150 gallons of Weedestroy AM-40 (2,4-D). All herbicide applications included a non-ionic surfactant at a rate of 0.125 gallons per acre.

During 2014, 3,891 acres of water hyacinth were treated with 2,4-D, 176 acres of a water hyacinth/alligator weed mix with 2,4-D, 65 acres of common salvinia and 94 acres of giant salvinia with either a glyphosate/diquat mixture, or diquat depending on the time of year. From November 1st-March 31st, diquat is used to spray salvinia species, while a

glyphosate/diquat mixture is used from April 1st-October 31st based on the differences in plant metabolism and air temperatures. Also treated in 2014, 20 acres of willow trees, 16 acres of buttonbush, and 12 acres of sedge were treated with 2,4-D. Other vegetation treated includes 86 acres of frog's bit with diquat, 66 acres of duckweed using diquat, 3 acres of cut grass with glyphosate, and 6.5 acres of southern Naiad with penoxsulam.

In May 2014, LDWF contracted applicators to spray additional areas around the Wax Lake Outlet. Private applicators treated a total of 660 acres of vegetation including: 165 acres of water hyacinth, 165 acres of pennywort, 165 acres of alligatorweed, and 165 acres of primrose. A total of 330 gallons of Arsenal (Imazapyr) sprayed at 0.5 gallons per acre (gpa), and 165 gallons of Turbulence (surfactant) sprayed at 0.25 gpa were used during this treatment. No other contract sprays were conducted during 2014.

As of August 2015, 1,744 acres of water hyacinth, 138 acres of a water hyacinth/alligator weed mix, 7.5 acres of willow trees, and 13 acres of pennywort have been treated with 2,4-D. No contract applications have been conducted thus far in 2015.

CONDITION IMBALANCE / PROBLEM

Optimum production of finfish and shellfish in the Atchafalaya Basin is dependent on, and directly related to the extent of water level fluctuation of the Atchafalaya River. Strict adherence to the 30% share of the combined Mississippi and Red River flow is a limiting factor to this cycle. To the extent possible, water levels in the Basin should be managed to emulate the natural hydrologic cycle of the Basin. Unfortunately, such is not the case. In some years, high water levels are artificially held in the Basin for too long. When swamps are inundated past the month of April, elevated water temperature causes depletion of dissolved oxygen through decomposition of organic material. When the resulting poor quality water drains late in the year, it creates localized conditions for finfish ranging from stressful to lethal. The potential for harm is especially high if flood water levels are maintained into May, June, or July and subsequently drained with a rapidly descending river hydrograph.

The original ARB consisted of a small river with braided bayous and channels running through multiple lakes in cypress and tupelo swamps. With the dredging of the main river channel, the original system was critically altered. The great Grand Lake has all but disappeared and is now little more than a few scattered small lakes that are filling with sediment. The spoil from dredging on the sides of the main channel created habitat for whitetail deer and other upland species, but it also cut off the sheet flow of floodwaters to the back swamps. Channel training with the placement of bank stabilization levees along the river shoreline further cut off sheet flow of water.

The channel training project was designed to utilize water flow energy to scour the main channel. As the river scours a deeper channel, less water is available from normal hydrographs to flood the back swamps. The amount of water as lateral flow below the Old River Control structure doesn't overbank as it historically did. It now takes more water volume to fill the larger channel and provide beneficial flooding of the back swamps.

Because of the reduced over bank sheet flow into the back swamps, the method most commonly used to distribute oxygenated river water into the interior swamp is through the dredging of channels and the opening of bayous through the high river banks. This method successfully delivers water to the swamps, but it also transports and deposits tremendous amounts of sediment. Results of these actions can include permanent loss of deep water fisheries habitats in the backwater areas of the ARB.

CORRECTIVE ACTION NEEDED

Water flow through the ARB should be restored to emulate the historic flood drought hydrograph and allow flooding of an appropriate frequency, magnitude, and duration in the interior swamps. An ideal hydrograph would begin to flood the swamp gradually around December, continue inundation of the interior through March, and begin a slow decline through May. The drought portion of the cycle would begin in June and remain through October. The river bank should be restored to historical grade over lengthy portions of the river to allow sheet flow flooding of the interior swamps. Channels such as Coon Trap, Blue Point Chute, 21 Inch Canal, and American Pass that are delivering tons of sand and sediment into the interior swamp should be shut off or greatly constricted.

RECOMMENDATIONS

Continued participation in the Louisiana Department of Natural Resources Atchafalaya Basin Program is necessary. Participation in the Technical Advisory Group (TAG) is an opportunity to provide input on proposed projects and improve fisheries habitat.

LDWF will continue to monitor fish populations through standardized sampling as well as monitor recreational angler usage and harvest of largemouth bass through creel surveys. Standardized sampling will be conducted as per LDWF protocol.

Changes in commercial fishing regulations for the ARB are not necessary at this time. LDWF sampling efforts produce similar results on a consistent basis. Trip ticket information shows that the landings are affected by events beyond the control of regulations. Natural influences impact the ARB commercial fishery to such an extent that regulations more restrictive than those already in place statewide are not applicable.

EPA approved herbicides will be applied to nuisance aquatic weeds in accordance with the approved LDWF Aquatic Herbicide Recommendations. Water hyacinth will be controlled with 2,4-D (0.5 gal/acre) and a non-ionic surfactant (1 pint/acre). Both common salvinia and

giant salvinia will be controlled with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Aqua King Plus (0.25 gal/acre) and Air Cover (12 oz./acre) surfactants from April 1 to October 31. Outside of that time frame, diquat (0.75 gal/acre) and a non-ionic surfactant (0.25 gal/acre) will be used. Sedge will be controlled with the aforementioned salvinia treatments if it is associated with those plants. If it is targeted specifically, 2,4-D will be used in conjunction with a non-ionic surfactant (1 pt./acre). Alligator weed treatment depends upon the area of infestation. Imazapyr is more effective at controlling alligator weed and is less expensive than imazamox. However, imazapyr should only be used in areas where there is minimal threat to non-target species. Imazamox should be used to control alligator weed near homes and developed shorelines because it is safer on non-target species. In undeveloped areas, treatment rates are: Imazapyr (0.5 gal/acre)/ Inergy (0.25 gal/acre). In developed areas, recommended rates are: Imazamox (Clearcast) (0.5 gal/acre)/ Inergy (0.25 gal/acre).

LDWF will continue to closely monitor and treat giant salvinia infestations as necessary. Giant salvinia weevil releases will continue as long as salvinia accumulations are present.

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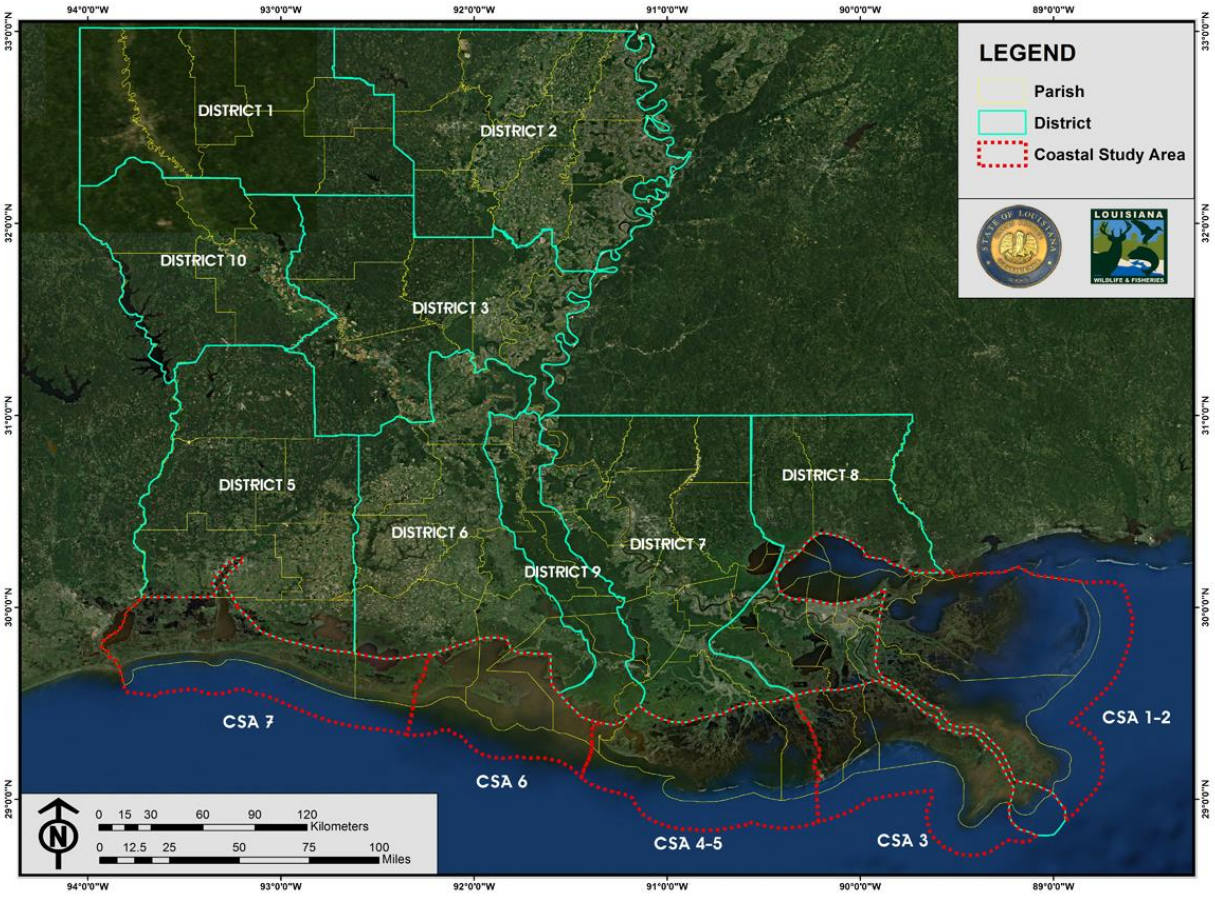
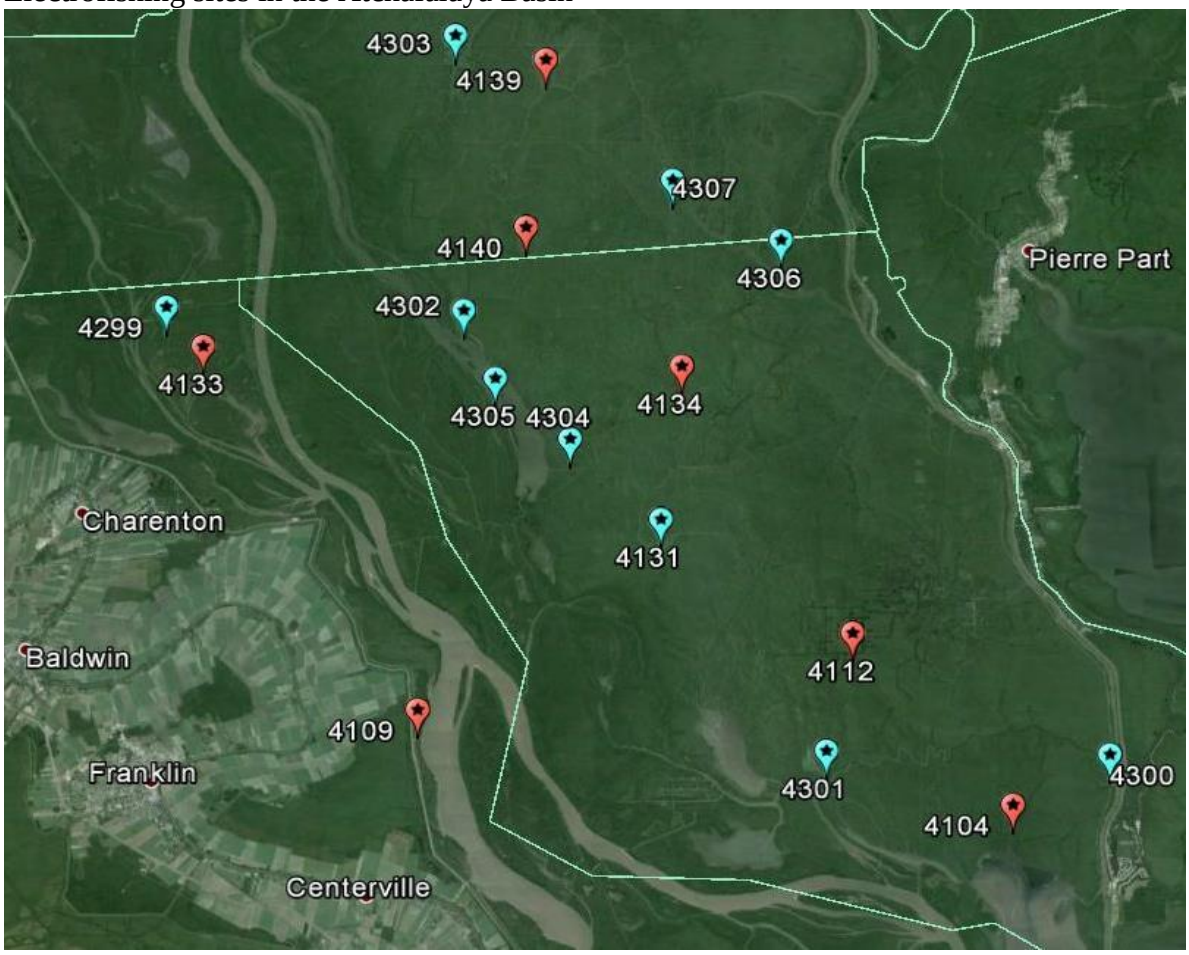
Appendix I - Maps

Realignment of Inland Fisheries Divisions and Marine Fisheries CSA's



Appendix I - Maps

Electrofishing sites in the Atchafalaya Basin



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Habitat Use in the Lower Atchafalaya River Basin, Louisiana
GREGG A. SNEDDEN,*1 WILLIAM E. KELSO, AND D. ALLEN RUTHERFORD
School of Forestry, Wildlife, and Fisheries, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, Louisiana 70803–6202, USA
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Spatial Distribution of Macroinvertebrates
Inhabiting Hydrilla and Coontail Beds
in the Atchafalaya Basin, Louisiana
JOSE-CHECO COLON-GAUD 1, W. E. KELSO 2, AND D. A. RUTHERFORD
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BOBBY C. REED
Louisiana Department of Wildlife and Fisheries
1213 North Lakeshore Drive, Lake Charles, Louisiana 70601, USA
WILLIAM E. KELSO AND D. ALLEN RUTHERFORD
School of Forestry, Wildlife, and Fisheries, Louisiana Agricultural Experiment Station
Louisiana State University Agricultural Center, Baton Rouge, Louisiana 70803, USA
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of the Mississippi River and Tributaries 1
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Center for Wetland Resources
Louisiana State University
Baton Rouge, Louisiana 70803
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Physicochemical Effects of the Flood Pulse on Fishes in the
Atchafalaya River Basin, Louisiana
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School of Forestry, Wildlife, and Fisheries, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, Louisiana 70703-6202, USA
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Patterns of Habitat Use among Vegetation-Dwelling Littoral
Fishes in the Atchafalaya River Basin, Louisiana
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School of Renewable Natural Resources, Louisiana State University Agricultural Center, Baton Rouge, Louisiana 70703-6202, USA
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the Atchafalaya River Basin, Louisiana
Q. C. FONTENOT,*1 D. A. RUTHERFORD, AND W. E. KELSO
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UTILIZATION OF MACROCRUSTACEANS FOR FOOD BY FRESHWATER

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Victor W. Lambou
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Baton Rouge, Louisiana

PHYSICOCHEMICAL EFFECTS ON THE ABUNDANCE AND DISTRIBUTION
OF LARVAL FISHES IN THE ATCHAFALAYA RIVER BASIN, LOUISIANA
A Thesis Submitted to the Graduate Faculty of the Louisiana State University and
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of Master of Science In The School of Renewable Natural Resources

THE INFLUENCE OF HYDRILLA INFESTATION AND DRAWDOWN ON THE
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Appendix III. (Parm vs. Shumate)
(CLICK HERE TO RETURN)

REVISED JANUARY 18, 2008
IN THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

No. 06-31045

NORMAL PARM, JR; HAROLD EUGENE WATTS; ROY MICHAEL GAMMILL; WILLIAM T ROGERS; ROBERT ALLEN BALCH
Plaintiffs - Appellants

v.

MARK SHUMATE, in his official capacity as Sheriff of East Carroll Parish
Defendant – Appellee

Appeal from the United States District Court
for the Western District of Louisiana

Before KING, GARZA, and BENAVIDES, Circuit Judges.
KING, Circuit Judge:

Plaintiffs-appellants Normal Parm, Jr., Harold Eugene Watts, Roy Michael Gammill, William T. Rogers, and Robert Allen Balch ("Plaintiffs"), recreational fishermen, appeal the district court's denial of their summary judgment motion and the grant of the cross-motion for summary judgment by defendant-appellee East Carroll Parish Sheriff Mark Shumate ("Sheriff Shumate"). Plaintiffs brought their claims against Sheriff Shumate under 42 U.S.C. § 1983, alleging that they were falsely arrested for trespass when they refused to cease fishing on waters covering ordinarily dry, private property (the Property") owned by Walker Cottonwood Farms, L.L.C., successor-in-title to Walker Lands, Inc. (collectively "Walker"). Plaintiffs argue that Sheriff Shumate lacked probable cause to arrest them for fishing on the Property because the public has a federal and state right to fish on the Property when it is submerged under the Mississippi River. Because we disagree, we AFFIRM the district court's judgment.

I. FACTUAL AND PROCEDURAL BACKGROUND

The underlying dispute in this case began over a decade ago, and the facts have been considered in various forms by multiple courts, including this one. Plaintiffs are lifelong boaters, hunters, and fisherman who fish on the Mississippi River in East Carroll Parish and other river parishes in northeast Louisiana. The water levels of the Mississippi River fluctuate seasonally. In East Carroll Parish, the normal low water mark is seventy-seven feet above mean sea level. Yet during the spring season the river floods well beyond its normal channel—as a result of increased rainfall and snow melt in the North—and the river regularly rises to as high as one hundred and twelve feet above mean sea level. It is normal for the river to remain at this level for at least two months.

The Property is located in East Carroll Parish. On its eastern side, the Property is bound by the Mississippi River, and on its western side, it is bound by the Mississippi River's levees. Buildings, crop lands and forests, with trees as tall as one hundred and forty feet, are located on the Property. In addition, waterways known as Gassoway Lake, Little Gassoway Lake, and other bodies of water are contained within its boundaries. Gassoway Lake, which Plaintiffs consider the most ideal venue for fishing on the Property, is located on the Property's western side, nearly three-and-a-half miles from the ordinary low water mark of the Mississippi River and its channel. Gassoway Lake is connected by a man-made drainage ditch to Bunch's Cutoff, which, in turn, flows into the Mississippi River. When the river floods in the spring, Gassoway Lake, along with the rest of the Property, is submerged under its waters.

Plaintiffs have fished the waters of Gassoway Lake when it was flooded by the Mississippi River, even though they knew that Walker objected to their presence. In 1996, Walker began filing complaints with Sheriff Shumate against boaters fishing on Gassoway Lake. Sheriff Shumate responded by arresting Plaintiffs, and others found on the Property, for trespass.1 While admitting that they did not have Walker's permission, Plaintiffs claimed that they were entitled to fish on the Property when it was flooded because Gassoway Lake was either: (1) owned by the State of Louisiana on behalf of the public; or (2) subject to state and federal servitudes.

The Attorney General for the State of Louisiana agreed with Plaintiffs' position and issued Louisiana Attorney General Opinion No. 96-206, concluding that channels of the Mississippi River traversed the Property and were "river bed" owned by the State. His opinion stated that "Lake Gassoway is a naturally navigable body of water under both State and Federal law and actually supports navigation for such purposes as hunting, fishing, [and] trapping . . . ." He also determined that the Property was subject to a public servitude.

Notwithstanding this opinion, Sheriff Shumate continued to arrest fishermen found on the Property. However, the East Carroll Parish District Attorney, James "Buddy" Caldwell, informed Sheriff Shumate that he did not intend to prosecute any of the Plaintiffs for trespass until the ownership and public servitude issues were resolved. To this day, Plaintiffs have not been prosecuted.

1 Specifically, they were arrested for violating LA. REV. STAT. ANN. § 14:63(B), which states: "No person shall enter upon immovable property owned by another without express, legal, or implied authorization."

On June 10, 1996, Walker filed suit in Louisiana state court against the East Carroll Police Jury, seeking a declaration that it owned the Property and an injunction prohibiting members of the public from entering without permission. *Walker Lands, Inc. v. Louisiana*, No. 17,746, slip op. at 1-2 (La. 6th Dist. Ct., May 1, 2003). The state trial court issued a temporary restraining order prohibiting the Police Jury, and all other persons or government agencies, from entering Gassoway Lake without permission for any purpose, including boating, fishing, or hunting. *Id.* at 2. The Police Jury filed a third-party demand against the State of Louisiana. The State was added as an indispensable party, and the Police Jury was eventually dismissed. *Id.* On March 16, 1998, the court granted Walker's motion for summary judgment and issued a permanent injunction. *Id.* The State

appealed to the Second Circuit Court of Appeal of Louisiana, which reversed, holding that the issues could not be resolved on summary judgment. *Id.*; *Walker Lands, Inc. v. East Carroll Parish Police Jury*, No. 31,490, slip op. at 5 (La. Ct. App., March 5, 1999).

On December 17, 2001, with the state trial court yet to issue a final decision, Plaintiffs filed this case in federal district court. Plaintiffs alleged that Sheriff Shumate lacked probable cause to arrest them in light of the opinion of the State Attorney General and the decision of the Second Circuit Court of Appeal. They claimed that:

> Until there is rendered a final judgment in the litigation pending in the Sixth District Court between [Walker] and the State of Louisiana, there is not sufficient legal evidence to prove, beyond a reasonable doubt, that the use of the naturally and regularly navigable waters of the Mississippi River, including those navigable waters that include Gassoway Lake, Little Gassoway, the old channel and Bunch's Cut-Off, results in a criminal trespass of the land of [Walker,] so long as the Plaintiffs utilize naturally occurring, navigable waters of the Mississippi River.

Plaintiffs sought damages for false arrest under 42 U.S.C. § 1983 and an injunction prohibiting further arrests for fishing on the Property until a "final judgment is rendered by a court of competent jurisdiction, specifying the ownership and navigational rights of the State of Louisiana and [Walker] relative to the [Property] . . . during normal water heights . . . ."

On June 4, 2002, Plaintiffs filed a motion for summary judgment, and on July 8, 2002, Sheriff Shumate filed a cross-motion for summary judgment or, in the alternative, a motion to stay the case pending resolution of the state court proceedings. Both motions were referred to a magistrate judge for a report and recommendation. Because there was a "reasonable probability that the state courts [might] find the waters at issue to be navigable and thus public," the magistrate judge held that a federal decision in this case could be obviated by the state proceeding. The district court adopted the report and recommendation, stayed the federal case, and Plaintiffs appealed. In an unpublished decision, we agreed that the questions of Louisiana law, then pending in a Louisiana court, might "render it unnecessary for federal courts to decide the constitutional issues presented in this case[,]" and affirmed the district court's stay. *Parm v.Shumate*, No. 02-31183, slip op. at 6 (5th Cir. June 16, 2003).

On May 1, 2003, the state trial court ruled that Walker owned the Property and had the right to exclude the public from it. *Walker Lands*, No. 17,746, slip op. at 1; *see also Walker Lands, Inc. v. East Carroll Parish Police Jury*, 871 So.2d 1258, 1261 (La. Ct. App. 2004). The court first noted that it was undisputed that the Property was either woodland or farmland in 1812, the year that Louisiana was admitted to the Union as a State.[2] *Walker Lands*, No. 17,746, slip op. at 1; *Walker Lands*, 871 So.2d at 1261. It found that during the 1860s and 1870s, the Mississippi River slowly but gradually shifted westward and submerged the

Property. *Walker Lands*, No. 17,746, slip op. at 1; *Walker Lands*, 871 So.2d at 1261. When the river subsequently shifted back eastward, it left behind a swale—a shallow depression in the land—which became Gassoway Lake through alluvion or accretion.[3] *Walker Lands*, No. 17,746, slip op. at 11-12; *Walker Lands*, 871 So.2d at 1261. Gassoway Lake and the other natural bodies of water on the Property were formed before 1910, when private landowners purchased it. *Walker Lands*, No. 17,746, slip op. at 11; *Walker Lands*, 871 So.2d at 1261. Moreover, the court determined that none of the waters on the Property were navigable. But for the man-made drainage ditch connected to Bunch's Cutoff and other structures, the court held, Gassoway Lake itself would be non-existent during the summer months. *Walker Lands*, No. 17,746, slip op. at 12-13. Since the waters lying on the Property were not navigable in fact, the trial court entered a permanent injunction prohibiting the public-at-large from going on Gassoway Lake, or on the land between Gassoway Lake and the Mississippi River. *Walker Lands*, No. 17,746, slip op. at 12-14; *Walker Lands*, 871 So.2d at 1262-63.

The State appealed the trial court's decision to the Second Circuit Court of Appeal, which affirmed in part and reversed in part. *Walker Lands*, 871 So.2d at 1268-69. The appellate court accepted the trial court's findings of fact and held that the Property was privately owned. The court rejected the State's argument that the Property was the bed of the Mississippi River—and therefore owned by the State—because a river's bed consists only of the land lying below the river's ordinary low water mark. *Id.* at 1262 n.7. It did not matter that the Mississippi River sometimes flooded the Property. *Id.* at 1264.

2 Bodies of water formed before 1812 are owned by the State. *See Dardar v. LaFourche Realty Co., Inc.*, 985 F.2d 824, 826-27 (5th Cir. 1993).

3 Alluvion and accretion are used synonymously to describe the addition of soil by gradual deposit. *Walker Lands*, 871 So.2d at 1264 n.13. Under Louisiana law, "[a]ny alluvion . . . which forms along the banks of a river belongs to the riparian landowners who own the land adjacent to the river, when the river shifts course." *Id.* at 1264 (citations omitted).

Privately owned land does not become part of a navigable body of water when a nearby navigable body of water overflows its normal bed and temporarily covers the property. Gassoway Lake is landlocked and does not now lie in the bed of the Mississippi river, which is some three and one-half miles to the east; likewise, it is not a channel of the river, since it is cut off from it.
Id. (citations omitted). In addition, the court held that Gassoway Lake was not a navigable body of water owned by the State because it was not a navigable body of water in fact. *Id.* at 1265-66.

Nevertheless, the Second Circuit Court of Appeal lifted the state trial court's injunction because Walker lacked standing to seek relief against a hypothetical public-at-large. *Id.* at 1267. The court stated that while "[o]wners of private property may forbid entry to anyone for purposes of hunting or fishing and the like[,]" Walker could only ask for relief against a specific individual after that

person had invaded the Property. *Id.* The court declined to resolve whether there was a public servitude on the Property during the Mississippi River's peak stage. It observed that under Louisiana law, the bank of the Mississippi River consists of all the land lying between its ordinary low and high water marks, which includes all of the Property, and noted that a public servitude preserves a river's bank for the public's navigational use. *Id.* at 1268 & n.16. And while it stated that "[f]ishing and hunting on flooded lands do not meet the definition of using the bank of a river at its high water mark for a navigational purpose[,]" *id.* at 1268 n.6 (citations omitted), it "pretermit[ted] discussion" of the issue because the State had not properly raised it, *id.* at 1268.

On June 3, 2005, the Second Circuit Court of Appeal's decision became final when the Louisiana Supreme Court denied the State's application for a writ of certiorari. In light of the conclusion of the state court proceedings, on August 16, 2005, the district court lifted the stay in this case. The court ordered the parties to file supplemental briefs in support of their cross-motions for summary judgment and referred the matter to a magistrate judge for a report and recommendation. Sheriff Shumate filed briefs arguing that: (1) the case was moot because Plaintiffs merely sought relief "until the Second Circuit rules"; (2) there is no federal or state right to fish on private property above the Mississippi River's ordinary low mark; and (3) even if there was such a right, he was entitled to qualified immunity because it was not a clearly established constitutional right. Plaintiffs, on the other hand, argued that they were entitled to summary judgment because there is both a state and federal right to fish on the Property when it is submerged under the Mississippi River. They asserted that the case was not moot because their complaint sought damages for false arrest and an injunction, not just until the state proceeding was complete, but until the public's "navigational rights" were determined. Finally, they contended that Sheriff Shumate was not entitled to qualified immunity because he was not being sued in his personal capacity.

On April 21, 2005, the magistrate judge issued his report and recommendation. He rejected Sheriff Shumate's alternative arguments, stating that: (1) the case was not moot because the state appellate court expressly pretermitted ruling on the issue of navigational rights; and (2) Sheriff Shumate was not entitled to qualified immunity because the case was not brought against him in his personal capacity. Turning to the fundamental question in the case, the magistrate judge held that no federal statute authorized Plaintiffs to fish on the Property, nor did the "federal navigational servitude," which is derived from the Commerce Clause of the United States Constitution, grant persons the right to fish on navigable waters. However, the magistrate judge determined that federal common law *did* create a right to fish on navigable waters, and that this public right burdens the Property when it is submerged under the waters of the Mississippi River. Similarly, the magistrate judge held that Louisiana law grants to the public the right to use—including for purposes of fishing—the "running waters" found in the State, regardless of the river's stage.

On August 29, 2006, the district court adopted the report and recommendation in part. It agreed that neither federal statutes nor the federal navigational servitude provides Plaintiffs with the right to fish on the Property. The district court disagreed, however, with the magistrate judge's determination that federal common law and state law granted such a right. The district court stated that while this court has recognized a public right to reasonably use navigable waters, we have not found a right to fish on private lands. Moreover, although the district court found that the Property is a bank of the Mississippi River under Louisiana law and subject to a state servitude, the servitude "is limited to activities that are incidental to the navigable character of the Mississippi River and its enjoyment as an avenue of commerce. . . . [F]ishing and hunting are not included in these rights." Accordingly, the district court found that Sheriff Shumate had probable cause to arrest Plaintiffs for trespass and entered summary judgment on Sheriff Shumate's behalf.
This timely appeal followed.

II. DISCUSSION

Were view a grant of summary judgment de novo, viewing all the evidence in the light most favorable to the nonmoving party and drawing all reasonable inferences in that party's favor. *See Crawford v. Formosa Plastics Corp.*, 234 F.3d 899, 902 (5th Cir. 2000). "Summary judgment is proper when the evidence reflects no genuine issues of material fact and the non-movant is entitled to judgment as a matter of law." *Id.* (citing FED. R.CIV. P. 56(c)). "A genuine issue of material fact exists 'if the evidence is such that a reasonable jury could return a verdict for the non-moving party.'" *Id.* (quoting *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986)).

In order to prevail in a § 1983 claim for false arrest, a plaintiff must show that he was arrested without probable cause in violation of the Fourth Amendment. *Brown v. Lyford*, 243 F.3d 185, 189 (5th Cir. 2001) (citations omitted). In a suit brought against a municipal official in his official capacity, the plaintiff must show that the municipality has a policy or custom that caused his injury. *Kentucky v. Graham*, 473 U.S. 159, 165-66 (1985); *Monell v. N.Y. City Dept. of Soc. Servs.*, 436 U.S. 658, 689 (1979). If a municipal officer who has authority to establish final municipal policy makes a decision or orders a course of action, the municipality may be held liable for the officer's decision or order. *Pembaur v. City of Cincinnati*, 475 U.S. 469, 480-82 (1986); *see also Turner v. Upton County, Texas*, 915 F.2d 133, 136 (5th Cir. 1990) (holding that the municipality may be held liable for the illegal or unconstitutional actions of its final policy-makers as they engage in the setting of goals and the determination of how those goals will be achieved).

In this case, Sheriff Shumate does not argue that he lacked final policymaking authority. Nor does he continue to argue that he is entitled to qualified immunity, accepting Plaintiffs' assertion that they do not seek to hold

him liable in his individual capacity. The key issue, therefore, is whether Plaintiffs have either a federal or state right to fish on the Property in the spring during the Mississippi River's normal flood stage. If they do not, Sheriff Shumate had probable cause to arrest them for trespass and was entitled to prevail on summary judgment.

A. Federal Rights

Plaintiffs argue that they have a federal right to fish on the Property when it is covered by the Mississippi River's waters because the Mississippi River is a navigable waterway of the United States. They contend that a federal navigational servitude burdens the Property, creating a public right to fish there. Plaintiffs also assert that there is a corresponding federal common law right to fish on the navigable waters of the United States. In response, Sheriff Shumate argues that: (1) the Property is not burdened by any federal easements because the Property is not a navigable waterway in fact; (2) the federal navigational servitude does not create a right to fish; and (3) there is no federal common law affecting riparian land owners' property interests.

It is well established that the Commerce Clause of the United States Constitution gives the federal government a "dominant servitude" over the navigable waters of the United States. *United States v. Cherokee Nat. of Okla.*, 480 U.S. 700, 704 (1987) (citation omitted). The so-called navigational servitude extends "laterally to the entire water surface and bed of a navigable waterway, which includes all the land and waters below the ordinary high water mark." 33 C.F.R. § 329.11(a); *see also United States v. Rands*, 389 U.S. 121, 123 (1967).

A river's ordinary high water mark is set at "the line of the shore established by the fluctuations of water . . . ." 33 C.F.R. § 329.11(a)(1). It is ascertained by "physical characteristics such as a clear, natural line impressed on the bank; . . . changes in the character of the soil; destruction of terrestrial vegetation; . . . or other appropriate means that consider the characteristics of the surrounding areas." *Id.* The navigational servitude does not burden land that is only submerged when the river floods. *Oklahoma v. Texas*, 260 U.S. 606, 632 (1923); *United States v. Harrell*, 926 F.2d 1036, 1041-43 (11th Cir. 1991); *United States v. Claridge*, 416 F.2d 933, 934 (9th Cir. 1970).[4]

As implied by its very name and the constitutional provision from which it arises, the federal navigational servitude is concerned with *navigational* rights and *commerce*. *See United States v. Montana*, 450 U.S. 544, 551 (1981) ("The State's power over the beds of navigable waters remains subject to only one limitation: the paramount power of the United States to ensure that such waters remain free to interstate and foreign commerce."); *Kaiser Aetna v. United States*, 444 U.S. 164, 177 (1979) ("The navigational servitude . . . gives rise to an authority in the Government to assure that such streams retain their capacity to serve as continuous highways for the purpose of navigation in interstate commerce."); *United States v. Chi. M., St. P.&P.R. Co.*, 312 U.S. 592, 596 (1941) ("[T]he rights of the title holder are subordinate to the dominant power of the federal Government in respect of navigation.") (citing *Gibson v. United States*,

166 U.S. 269, 272 (1897)). Neither navigation nor commerce encompass recreational fishing. *See Phillips Petroleum Co. v. Mississippi*, 484 U.S. 469, 482-84 (1988) (noting that fishing is not related to navigability); *George v. Beavark, Inc.*, 402 F.2d 977, 981 (8th Cir. 1968) ("Although the rule on navigability has been at times liberalized, to our knowledge none of the authoritative cases has liberalized the rule so as to indicate that mere pleasure fishing on a stream of water is such usage as would constitute navigability."). Accordingly, the navigational servitude does not create a right to fish on private riparian land.

Moreover, Plaintiffs' claim to a federal right ignores "the 'general proposition [that] the law of real property is, under our Constitution, left to the individual States to develop and administer.'" *Phillips Petroleum*, 484 U.S. at 484 (citation omitted). Louisiana took title to all lands below navigable waters in its boundaries when it was admitted to the Union. *Dardar*, 985 F.2d 824, 826- 27 (citation omitted); *see also Texas v. Louisiana*, 410 U.S. 702, 714 (1973); *Utah v. United States*, 403 U.S. 9, 10 (1971); *Pollard's Lessee v. Hagan*, 44 U.S. 212, 230 (1845). It has broad authority to regulate public trust lands, including the Property, as it sees fit. *See Phillips Petroleum*, 484 U.S. at 482-84. Louisiana may regulate or prohibit the use of land held in public trust. *See McCready v. Virginia*, 94 U.S. 391, 395 (1876) (upholding a state statute that prohibited non-state citizens from planting oysters in tidal lands); *Smith v. Maryland*, 59 U.S. 71, 74-75 (1855) (upholding a state statute that prohibited a federally licensed ship from dredging for oysters in the Chesapeake Bay). It may "retain for the general public the right to fish, hunt, or bathe on these lands." *Phillips Petroleum*, 484 U.S. at 482-84. Or, as it did here, it may relinquish title to a private landowner. *Id.* at 483; *see also Dardar*, 985 F.2d at 830 (stating that Louisiana may relinquish lands that are periodically overflown by the waters of the Mississippi). In any event, as things now stand, the right to fish on public trust lands is governed by Louisiana law, and there is no reason for us to displace that law by adopting a federal rule of decision in this context.[5] *See Wallis v. Pan Am. Petroleum Corp.*, 384 U.S. 63, 68 (1966) (stating that it is for Congress to decide whether latent federal power should be exercised to displace state law).

4 Plaintiffs argue that the Property is below the high water mark based on the Second Circuit Court of Appeal's finding that the high water mark is one hundred and twelve feet above mean sea level (the high water mark during the spring flooding season). The explanation for the Louisiana court's conclusion is that Louisiana has rejected the federal definition of high water mark and relies, instead, on the ordinary seasonal flood levels. *DeSambourg v. Bd. of Comm'rs for the Grand Prairie Levee Dist.*, 621 So.2d 602, 612 (La. 1993). Unfortunately, neither party submitted sufficient summary judgment evidence to determine where the federal high water mark lies, although it is unlikely that it includes much of the Property. *See Harrell*, 926 F.2d at 1043 ("To argue that the government's jurisdiction should extend laterally as much as three miles on either side of the Tombigbee River is ludicrous.").

B. State Navigational Servitude

Plaintiffs argue that a state servitude burdens the Property and grants them the right to fish upon it when it is flooded. Plaintiffs assert that this right exists in the Louisiana Constitution, which provides that the freedom to hunt, fish, and trap wildlife is a valued natural heritage that will be forever preserved. *See* LA. CONST. art. I, § 27. They also find support in the Louisiana Civil Code, which provides that everyone has the right to fish in the State's rivers. *See* LA. CIV.CODEANN. art. 452. Finally, they contend that the Property is burdened by the State for the public's use because Louisiana owns all of the running waters in the State. *See id.* art. 456. In response, Sheriff Shumate argues that the right to fish in Louisiana is explicitly limited to public lands and does not extend to private riparian property. Moreover, he argues that the Second Circuit Court of Appeal, while failing to hold that the Property is free of a state servitude because the issue was not properly raised, left a "guide post" for this court by noting in passing that the public does not have a right to fish on private lands. We agree with Sheriff Shumate.

First, the Louisiana Constitution, far from creating a private right to fish on the Property, explicitly reserves to private property owners the right to refuse consent to fishermen's entry on their land. The article Plaintiffs rely on reads:

> The freedom to hunt, fish, and trap wildlife, including all aquatic life, traditionally taken by hunters, trappers and anglers, is a valued natural heritage that shall be forever preserved for the people. . . . Nothing contained herein shall be construed to authorize the use of private property to hunt, fish, or trap without the consent of the owner of the property.

See LA. CONST. art. I, § 27.[6] When the article is read in full, it is plain that the right to fish is circumscribed and does not extend to waters on private property.

Second, the Louisiana Civil Code does not create a right to fish upon the Property, even if we assume that the Property in its entirety is a bank of the Mississippi River. Under Louisiana law, the "banks of navigable rivers are private things that are subject to public use." LA. CIV. CODE ANN. art. 452; *see also Buckskin Hunting Club v. Bayard*, 868 So.2d 266, 275-76 (La. Ct. App. 2004). The public use, however, is limited to use for navigational purposes. *Walker Lands*, 871 So.2d at 1268 n.6 (citations omitted); *Buckskin Hunting Club*, 868 So.2d at 276 (citation omitted). As stated in the comments to article 456, "[a]ccording to well-settled Louisiana jurisprudence, which continues to be relevant, the servitude of public use under this provision is not 'for the use of the public at large for all purposes' but merely for purposes that are 'incidental' to the navigable character of the stream and its enjoyment as an avenue of commerce." LA. CIV. CODE ANN. art. 452 cmt. b (citations omitted). The Second Circuit Court

of Appeal noted, in the parallel state proceeding, that fishing on the banks of the Mississippi River does not meet the definition of a navigational use. *Walker Lands*, 871 So.2d at 1268 n.6 (citations omitted). We agree. *See, e.g.*, *State v. Barras*, 602 So.2d 301, 305 (La. Ct. App. 1992) (holding that fishing was not incidental to navigation); *Edmiston v. Wood*, 566 So.2d 673, 675-76 (La. Ct. App. 1990) (same).

Finally, we reject Plaintiffs' argument that they have the right to fish on the Property when it is submerged under the Mississippi River because "running waters" are public things owned by the State. Under Louisiana law, "public things" belong to the State, and "public things" include "running waters." LA. CIV. CODE ANN. art. 456. Plaintiffs argue that the public has a right to fish on the running waters of the State based on *Chaney v. State Mineral Bd.*, 444 So.2d 105 (La. 1983). In that case, the Louisiana Supreme Court stated that the running waters over non-navigable streams are preserved for the general public. *Id.* at 109. This court has since determined that claims to the use of waterways based on *Chaney* have "failed to carry the day in Louisiana courts." *Dardar*, 985 F.2d at 834 (citation omitted). We have no reason to deviate from that holding. To the contrary, the Third Circuit Court of Appeal of Louisiana recently stated that although an owner must permit running waters to pass through his estate, Louisiana law "does not mandate that the landowner allow public access to the waterway." *Buckskin Hunting Club*, 868 So.2d at 274.

III. CONCLUSION

For the reasons stated above, we AFFIRM the district court's judgment.

6 This section of the Louisiana Constitution did not become effective until December 7, 2004. We, therefore, do not cite it for the proposition that Sheriff Shumate had probable cause to arrest Plaintiffs, but to show that the hortatory passage Plaintiffs rely on is limited in nature.

United States Court of Appeals
Fifth Circuit

F I L E D
December 28, 2007
Charles R. Fulbruge III
Clerk